MINI PROJECT REPORT

on

HEALTHSPACE – Your personal healthcare companion

Submitted in partial fulfilment for the completion of

B.E., IV Semester

INFORMATION TECHNOLOGY

By

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CERTIFICATE

This is to certify that the Mini Project-II entitled "**HEALTHSPACE"** submitted to **CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY,** in partial fulfilment of the requirements for the completion of B.E., IV semester Information Technology, during the academic year 2020-2021, is a record of original work done by **HUMA HUSSAIN (160119737067) & ISHIKA GUPTA (160119737068)** during the period of study in the Department of IT, CBIT, HYDERABAD, under my supervision and guidance.

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DECLARATION

We the undersigned solemnly declare that the project report is based on our own work carried out during the course of our study under the supervision of Mr. Srikanth.

We certify that:-

- The portrayal of the desktop application is original and has been done by us under the general supervision of our supervisor.
- The work has not been submitted to any other Institution for any other degree/diploma/certificate in this university or any other University of India or abroad.
- We have followed the guidelines provided by the university in writing the report.
- Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and giving their details in the references.

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ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our teacher Mr. Srikanth who gave us the golden opportunity to do this wonderful mini project titled ‘Healthspace’ which also helped us in doing a lot of research and assisted us in expanding our programming skillsets and creative thought process too.

Secondly, we would also like to thank our parents and friends who helped us a lot in finalizing this project within the limited time frame.

Lastly, a special appreciation to our partners for the constant support we’ve had for each other and the learning we did together.

ABSTRACT

The health system is an essential socio-economic activity and therefore it requires rational and effective management. An efficient hospital management system can go a long way and can make administrative work in hospitals, which is just as important as any other hospital work, easy.

Hospitals act as the main actors of the healthcare systems and consequently generate an essential volume of information. Unfortunately, in most cases, this vital information is dispersed or is not available in the necessary time and format, leading to disasters.

“Healthspace” makes use of tools such as database management system, Java, and a proper java database connectivity to efficiently manage crucial information about medical records, patients, doctors, and bills, by having a database of each model implemented. By digitizing most of the processes in the institution, “Health Space” improves customer service and reduces the process cost.

In addition, “Healthspace” controls and schedules online appointments in such a way that the patient is allowed to look at the information and qualifications of the doctors available before actually booking an appointment with them. This increases the customer satisfaction.

Right from entering the patient into the database, into the health service, to finally discharging them, “Healthspace” makes managing information very easy, for the patient as well as the doctor. It also makes it extremely convenient to cancel appointments by the simple click of a button.

“Healthspace” is the go to place for you to manage your health in the easiest way possible.

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INTRODUCTION

1.1 INTRODUCTION:-

Health is a state of physical, mental, and social well-being in which disease and infirmity are absent. For a smooth lifestyle, a healthy system is of necessity. Moreover, its functioning and management is of further importance, especially for hospitals that are the sole holders of health administration.

For effective and convenient management of various processes that take place in a hospital, hospital management systems come into picture. Hospital management systems allow us the ability to optimize and digitize all the processes within the institution, which will help to improve customer service, reduce process costs, streamline the search of medical records, bills, patients, doctors, etc. They also enable having a record which is specific for each module whenever the database is in need.

All in all, 'Healthspace' acts as the most effective interface between doctors and patients which is why it truly is your personal healthcare companion!

1.2 APPLICATION:-

'Healthspace' has its roots from hospital management systems from where it branches out to not just being a robust health experience but also a catalyst for unhindered interaction between doctors and patients. Its value also notices a surge considering the ongoing pandemic as it facilitates virtual communication. By using tools like database management system, java and JDBC, it successfully stores all critical information, including patient-specific disease, required by a hospital and its clients and displays them accordingly.

Being a user-friendly application, 'Healthspace' provides segregated domains for doctors and patients for their information to be stored and accessed easily. Its major feature is to efficiently schedule and cancel appointments whenever the necessity rises. It is an application that will stick by its user right from the registration process and keeps constant track of any updates.

1.3 MOTIVATION:-

A health system is important and therefore it is necessary to have an effective management for hospitals. Hospitals act as the main actors of the healthcare systems and consequently generate an essential volume of information. They're the sole holders of medical administration. Unfortunately, in most cases, this vital information is dispersed or is not available in the necessary time and format, leading to fatal peccadillos. By collecting and saving patients' information, including diagnosis reports, medical history, allergy reactions, vaccinations, treatment information plans, test results, etc., Health Information Systems provide the healthcare providers a complete and orderly framework that helps them interact with their patients in a better way and eventually deliver care to them in a more efficient way. This is the sole reason that drove us to create a platform that enabled us to do this.

1.4 PROBLEM STATEMENT:-

To create a user friendly and efficient hospital management system facilitating easy booking and cancelling of appointments and better interaction between doctors and patients.

1.5 AIM & OBJECTIVE:-

The main driving force for this project was the ongoing pandemic that has urged people to take a closer look at their health which has increased the necessity and usage of healthcare systems that creates an efficient interface between patients and doctors in these testing times.

SYSTEM REQUIREMENTS

2.1 FUNCTIONAL REQUIREMENTS:-

Java is both a programming language and a platform. You can use it to write or create various types of computer applications. The java platform is a new software platform which is designed to deliver and run highly interactive, dynamic and secure applications on networked computer systems. Programs written in java are compiled into java byte code which is then interpreted by a special java interpreter (JAVA VIRTUAL MACHINE-JVM) for a specific platform. The JVM is an abstract machine designed to be implemented on the top of the existing processors. It hides the underlying operating system from java applications. The JVM can be implemented in software and hardware. JVM combined with Java API (Application Programming Interface) are libraries of compiled code that can be used in programs.

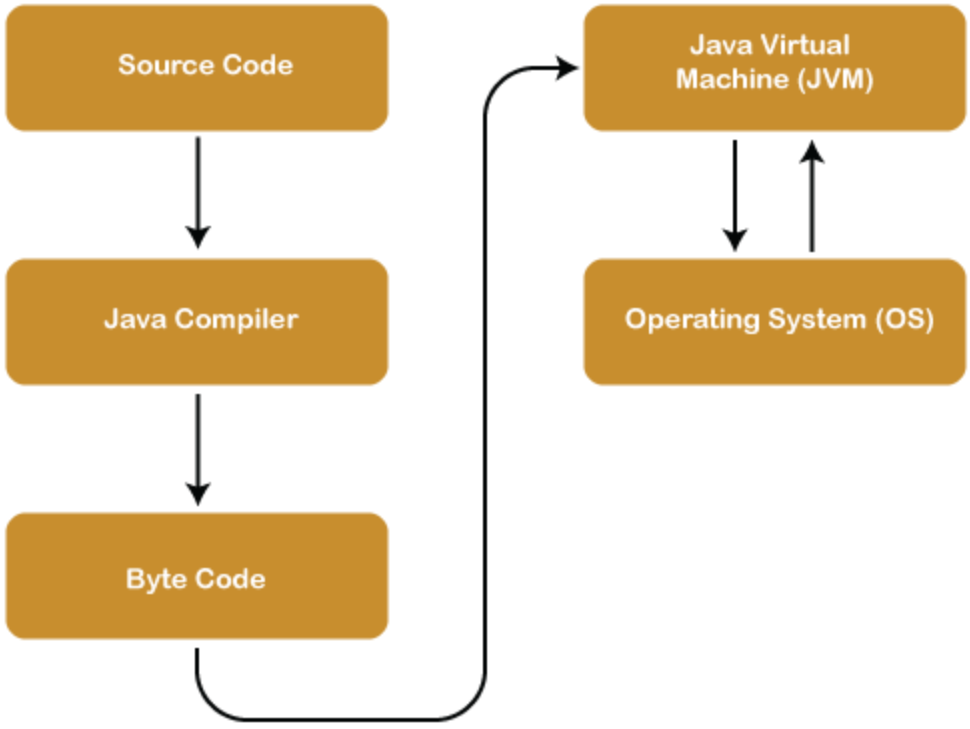


Fig 2.1: Java Interpreter

When we design real life applications such as a hospital database management system, we encounter situations wherein we need to manipulate data stored in a database through the application we have designed.

Since we developed a java GUI application using NetBeans IDE, we have used the concept of JDBC(JAVA DATABASE CONNECTIVITY).

We have connected to a relational database (MySQL) from within a java application using JDBC. JDBC establishes a connection with the MySQL database, sends SQL statements to the database server and processes the results obtained. These various data accessing functions are handled by the JDBC API which consists of a set of Java classes that use predefined methods.

The 4 main classes in the JDBC API include: DriverManager, Connection, Statement, and ResultSet.

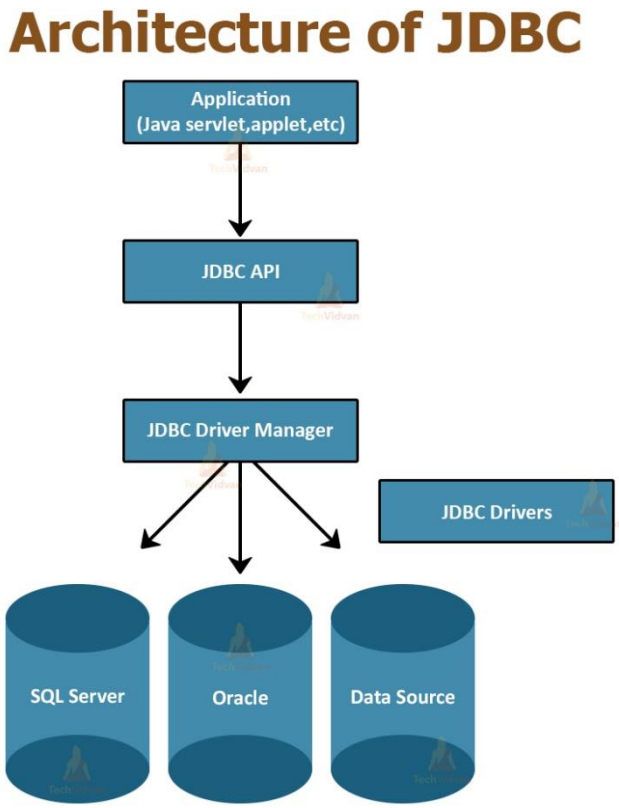


Fig 2.2: Architecture of JDBC

2.2 NON-FUNCTIONAL REQUIREMENTS: -

GUI stands for Graphical User Interface. In java, GUI features are supported via JFC (Java Foundation Classes). One major feature of JFC is Swing API which includes everything from buttons to split panes to tables and every other functionality to create a GUI application. There are 3 tiers of software in GUI programs created using Java Swing:

Graphical components that make up the GUI such as a button or textbox or menu etc. Each graphical component has certain properties. A property is a characteristic of an object such as its size, color, title etc.

Event listeners that get notified about events and respond to them.

Event handler that do the work for the user in case the event occurs.

The graphical controls that you put in a GUI application are broadly of two types: Container and child controls. The container can hold other controls within it (examples: frames, panels). Controls inside a container are child controls. A GUI application must contain a top level container that can hold other controls.

The three major players that add functionality to GUI are:

The event: it is an object that gets generated when user does something such as mouse click, dragging, pressing a key on the keyboard etc.

The source of the event: the component where the event has occurred is the source of the event.

The event listener: it is attached to a component and contains the methods that will execute in response to the event. These methods are stored inside the listener interface.

2.3 SOFTWARE REQUIREMENTS

NetBeans IDE is a free, open-source, cross-platform IDE(Integrated Development Environment) with built-in support for java programming. It offers a RAD style of developing for Windows programmers. It enables us to develop applications by creating frames, dragging and dropping

controls onto the frames, setting properties for various things and adding some application specific code to handle events

MySQL is a freely available open source Relational Database Management System (RDBMS) that uses Structured Query Language(SQL). In a MySQL database, information is stored in tables. It provides a rich set of features that support a secure environment for storing, maintaining and accessing data. It is a fast, reliable and scalable alternative to many of the commercial RDBMSs available today. It has a client-server architecture and is a multiuser database system.

2.4 HARDWARE REQUIREMENTS:-

When it comes to hardware needed, it is very simple. To create this desktop application, we needed a computer. It is easy to create this by using Windows PC and Windows 7 as these operating systems are stable and reliable. Another consideration for hardware is some sort of backup hard drive or removable USB memory stick(s) as It is important that we back up all of our website data to a removable drive in the event a computer crashes, is broken or is stolen. If we lose this data, we will be forced to start from scratch in many cases.

METHODOLOGY

3.1 ARCHITECTURE:-

3.1.1 ER DIAGRAM

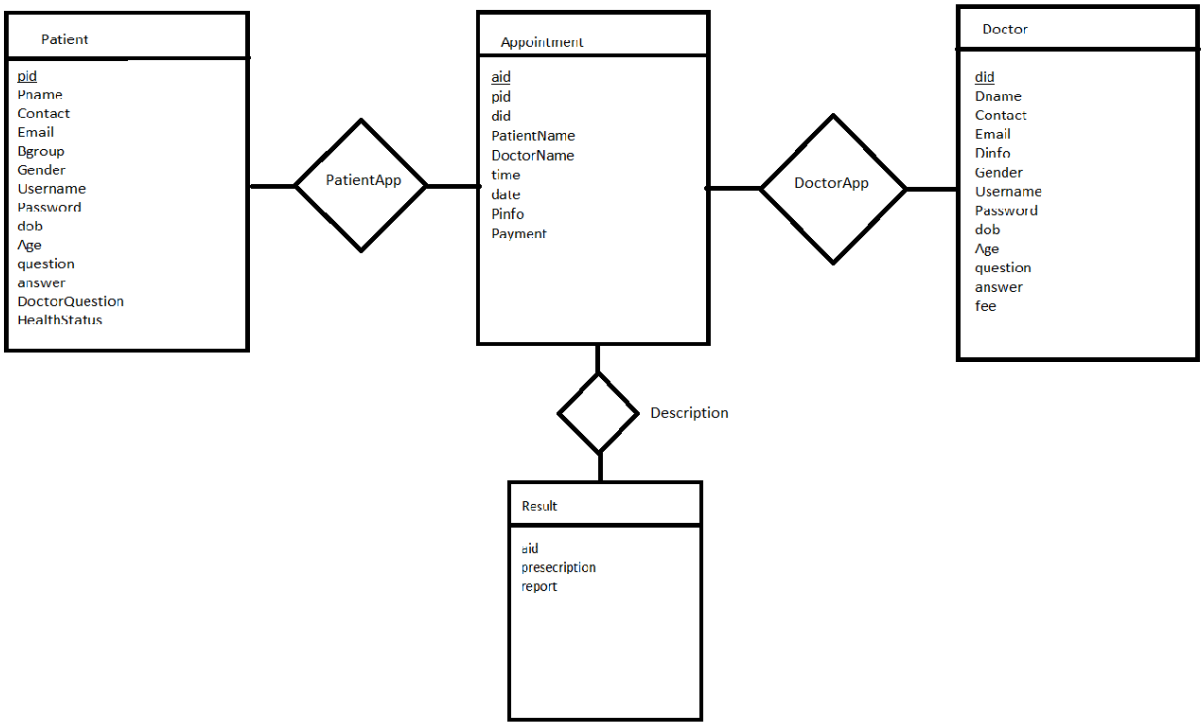


Fig 3.1: ER Model

The various tables included in our database include: patient , doctor , appointment , and result.

The patient table holds all information with respect to the patient. This includes their name, contact, email, blood group, gender, username, password, date of birth, age, security question, its answer, question asked by the doctor, and your answer to it. Upon registering a patient, each patient will be given a unique identifying number which is the pid attribute. This acts as the primary key of the table. Similarly, we have the doctor table which hold all relevant information with respect to the doctor. This includes their name, contact, email, specialization, gender, username, password, date of birth, age, security question, its answer, and the fee per appointment. The did attribute acts as the primary key of the table.

The appointment table keeps track of the appointments booked by various patients with various doctors. Every appointment is given a unique identification number which acts as the primary key of the table. The patient id and doctor id attributes of the table are foreign keys referring to the patient and doctor tables respectively. Apart from this the table contains the patient's name who has booked the appointment, the doctor's name with whom they have booked the appointment, the time and date on which they can take the appointment, the problem they are facing and the payment details.

The result table keeps track of the report and prescription written by the doctor for their patient for a particular appointment. The appointment id acts as the primary key. Prescription and report are attributes of the table.

3.1.2 JDBC CLASSES:

The four main classes in the JDBC API hierarchy that are generally used for the database connectivity are:

Driver Manager Class: it loads the JDBC driver needed for to access a particular data source, locates and logs on to the database and returns a connection object. The required JDBC driver must be registered with the JDBC Driver Manager before a connection between the java application and the JDBC data source can be made. Once a driver is registered and loaded, the driver manager class can use that driver to connect the java application to its associated data source, i.e , dbms. Once the connection is established, all database calls go directly to the JDBC driver itself by passing the Driver Manager.

Connection Class: it manages the communication between a java client application and a specific database (example: MySQL database), including passing SQL statements to the DBMS and managing transactions.

Statement Class: it contains SQL strings that are submitted to the DBMS. An SQL Select statement returns a ResultSet object that contains the data retrieved as the result of SQL statement.

3.2 ASSUMPTIONS:-

The assumptions we have made is that the systems have NetBeans installed in order to run this application.

In addition to that, we assume that the data being stored in the database is authentic and genuine.

3.3 REQUIREMENTS:-

We require that there is a large database for the application to run as efficiently as possible and that the information in the database is genuine.

IMPLEMENTATION, TESTING AND RESULT OF THE PROJECT

With the use of GUI on NetBeans IDE, all the pages were keenly created. The desktop application begins with the login page which comprises several buttons, labels and text fields that have been separately coded to serve their own purpose. All pages contain common header, footer, and center labels to represent unity amongst them all. All pages contain the back button that navigate them to the previous frame.

All the codes given below begin with a connection being made between the code and MySQL built-in classes provided by JDBC. Then a MySQL query is sent to access the data from the database which is then used in the JFrame.

The login page asks the user for their credentials if they have already registered as a doctor or a patient. If not, the login page also contains buttons that direct the user to create an account as a doctor or a patient. Once the user has entered his/her credentials, they can choose the radio button that takes them to their home page. The page also contains buttons that are required whenever a user forgets his/her password. This page comprises constraints that will not allow a patient to login with a doctor's credentials and vice versa. If a username is invalid or not present in the database, a pop-up will be shown which does not allow the user to log in. The page is

efficiently created to cater to doctors and patients separately.

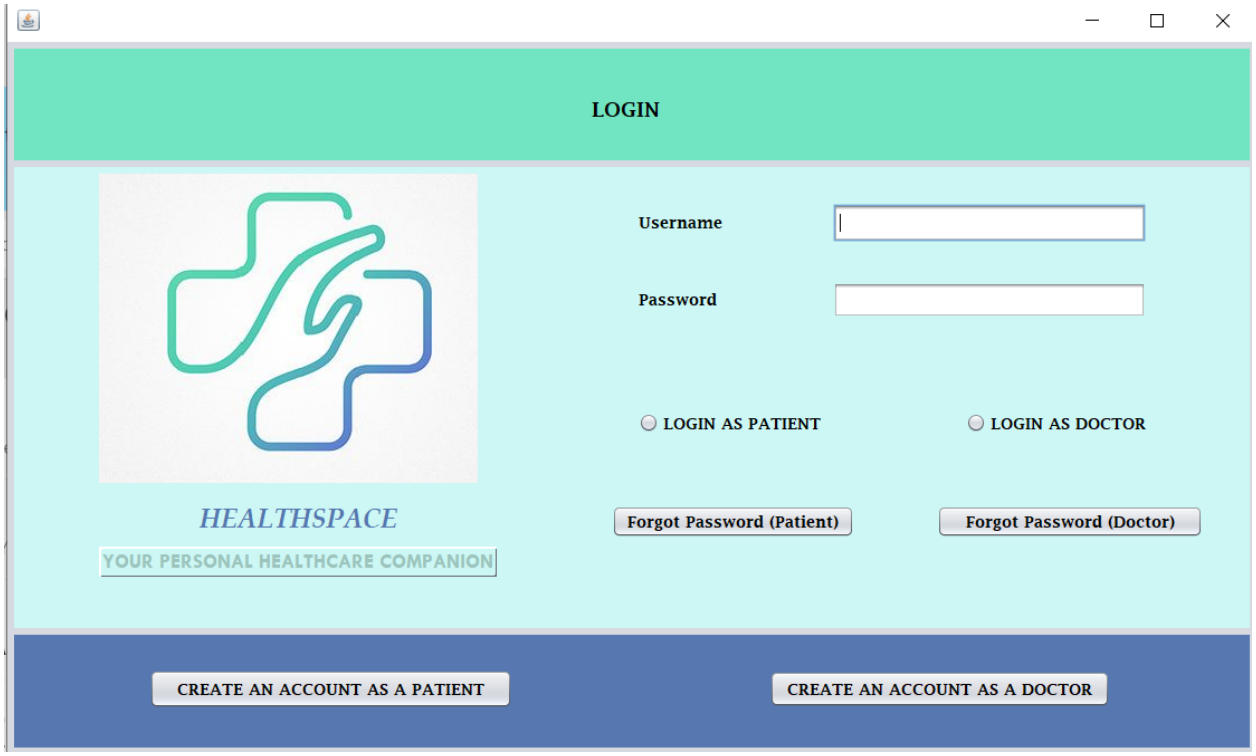


Fig 4.1: Login page

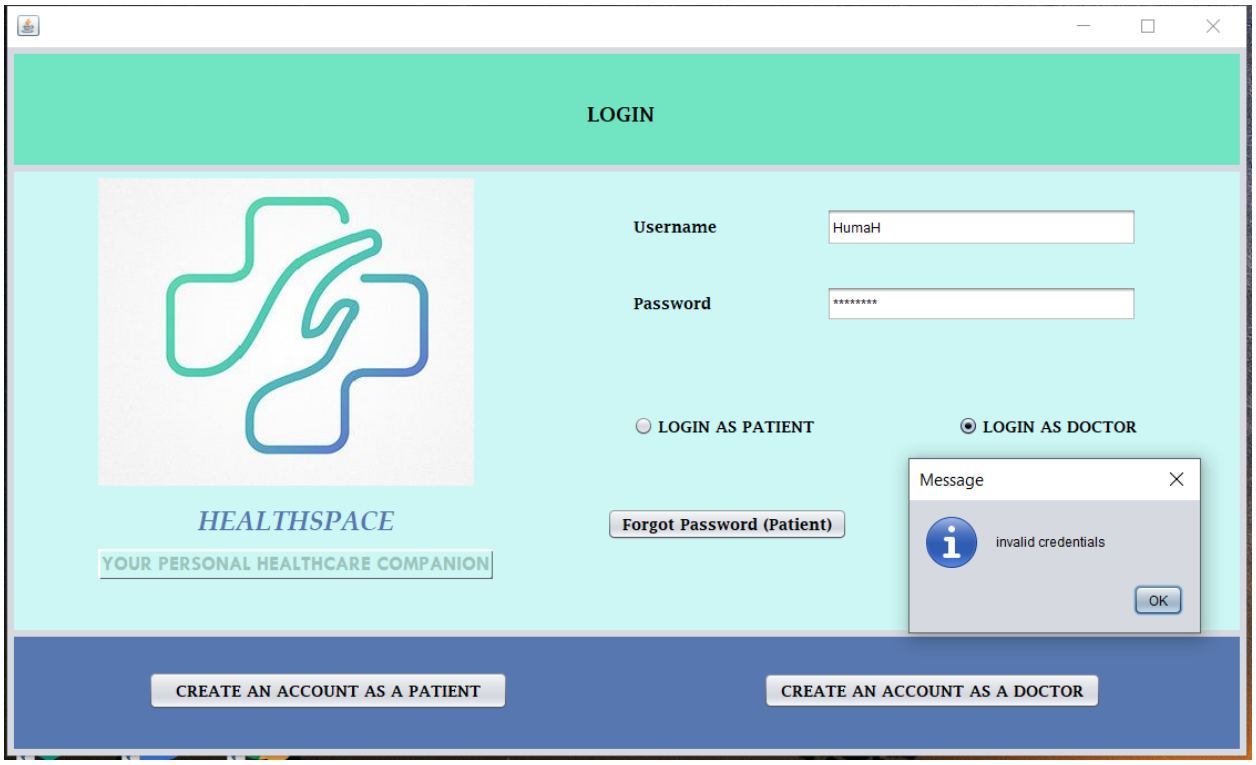


Fig 4.2: Testing invalid credentials

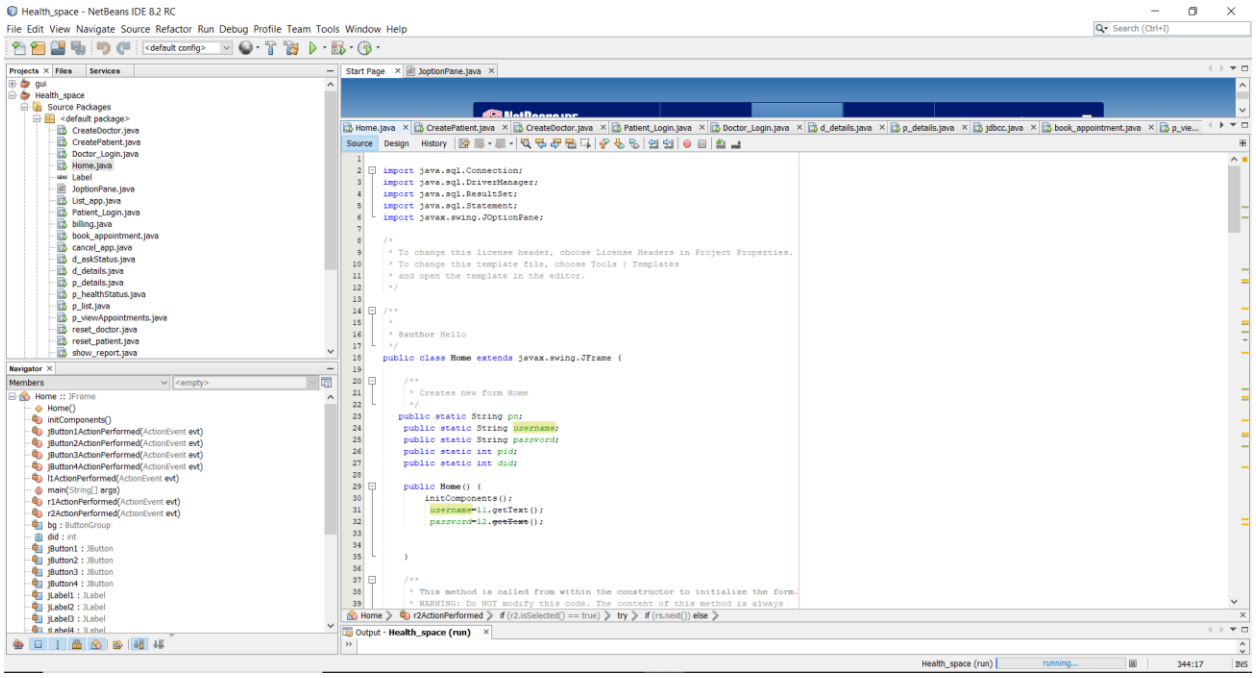


Fig 4.3: Login page code snippet

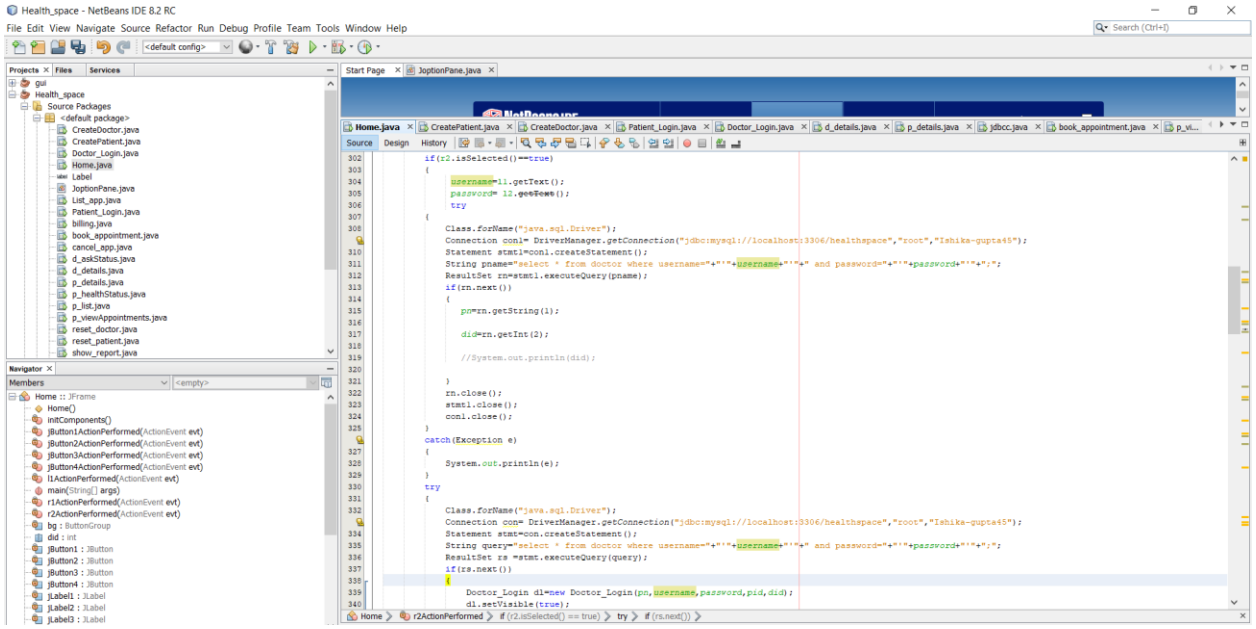


Fig 4.4: Login page code snippet 1

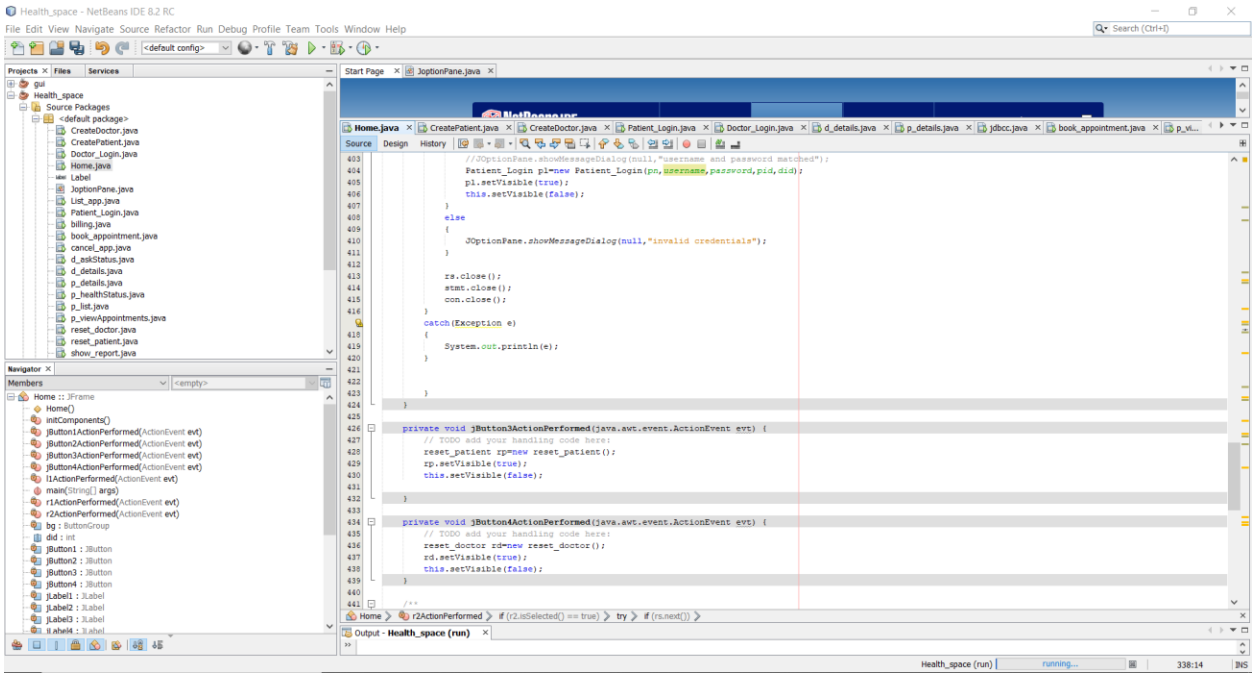


Fig 4.5: Login page code snippet 2

The register patient/doctor frames contains text fields that ask the user for their details that are eventually stored in the database. These details have several text constraints for example, the

contact number cannot be more than 10 digits and the email provided by the user should be of the correct format etc. Here, the username is the primary key which means that if a user enters a username that is already present in the database, that account will not be created. All the details added in the Create Patient frame are added to the Patient table and the details added in the Create Doctor frame are added to the Doctor table.

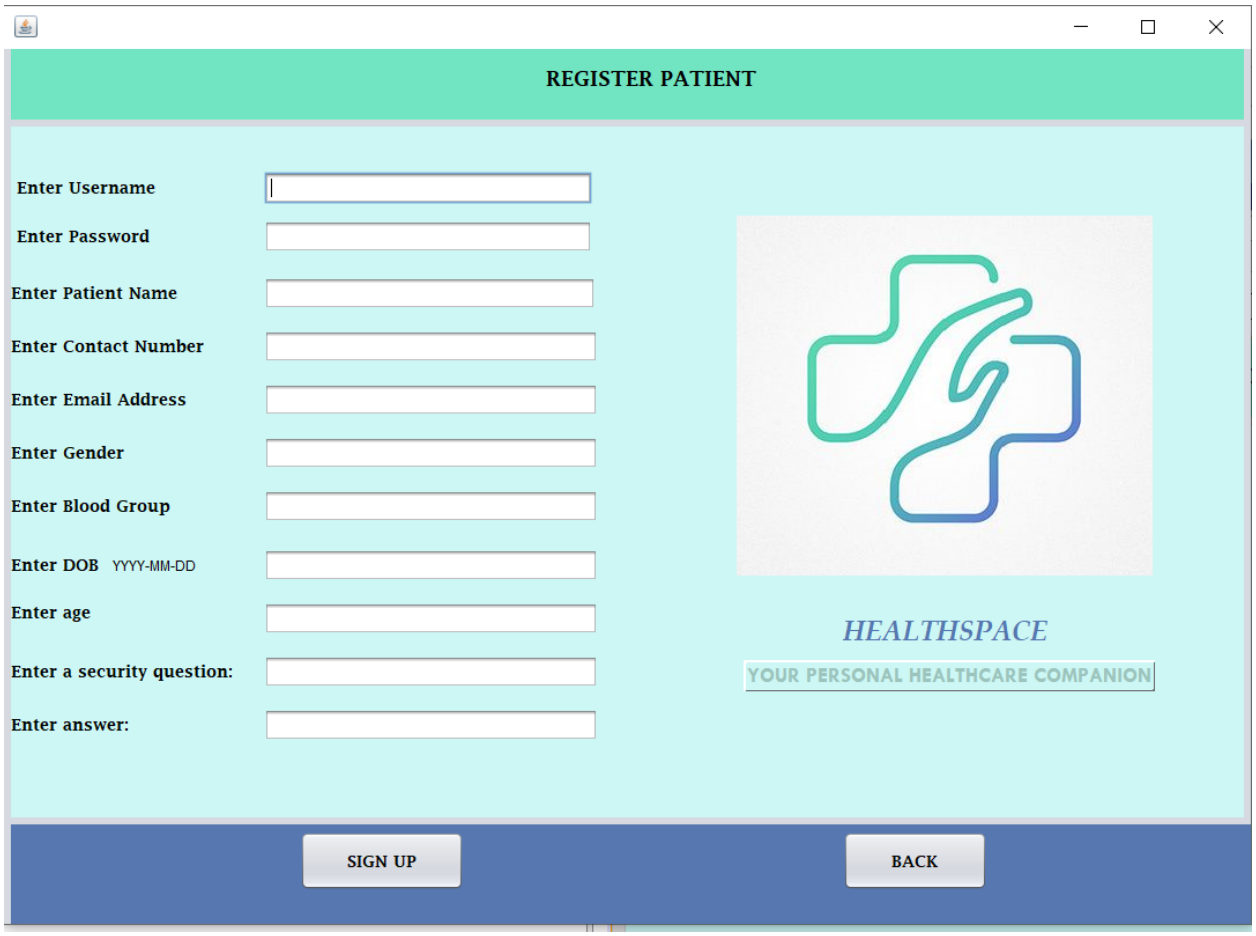


Fig 4.6: Create patient

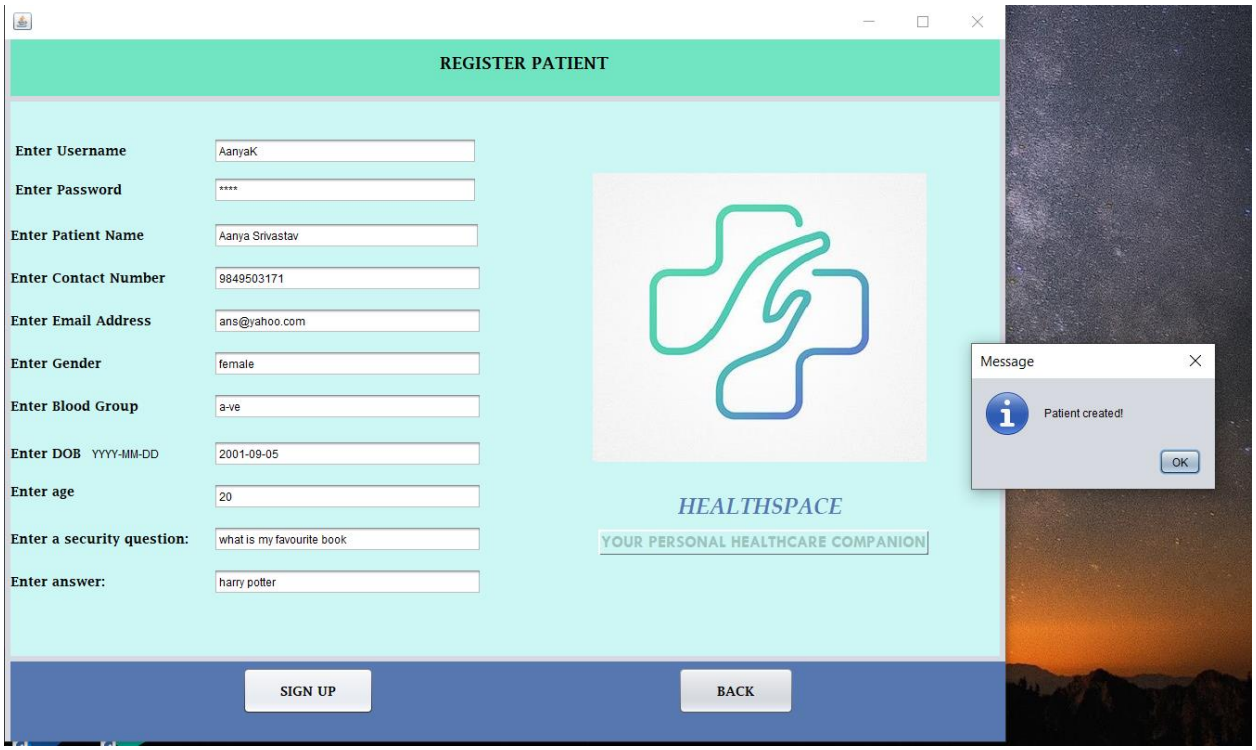


Fig 4.7: Patient created

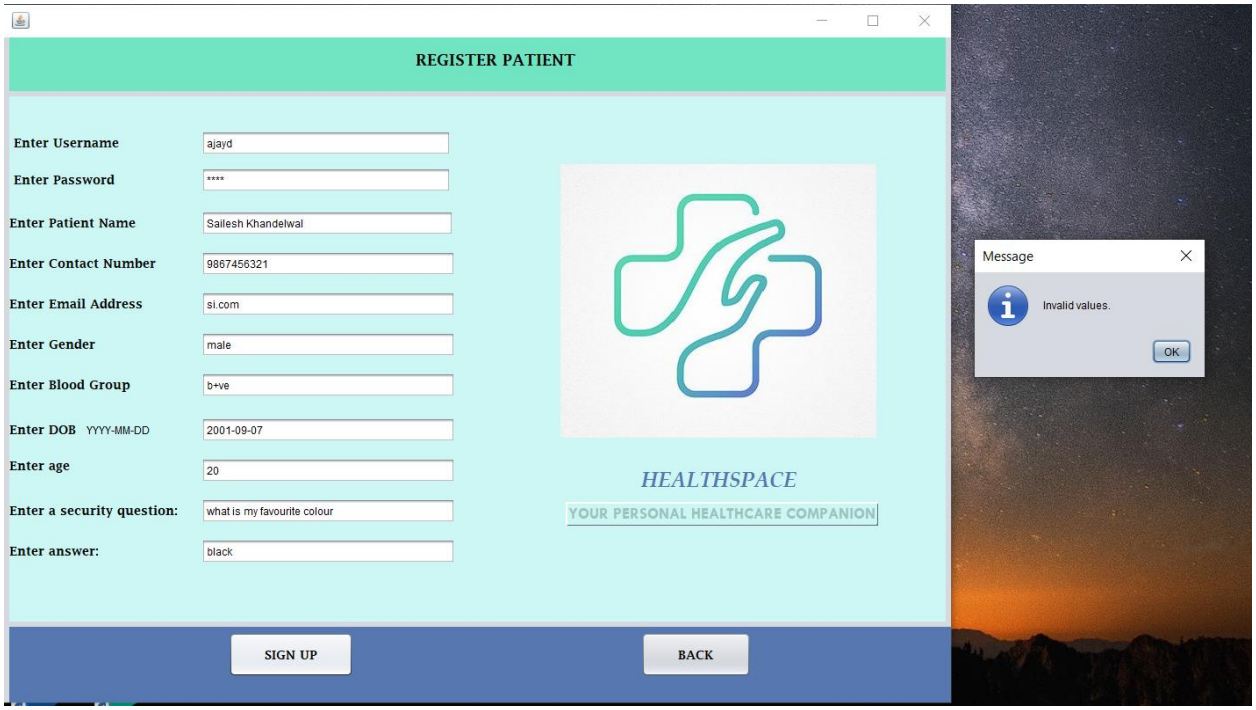


Fig 4.8: Invalid patient registration

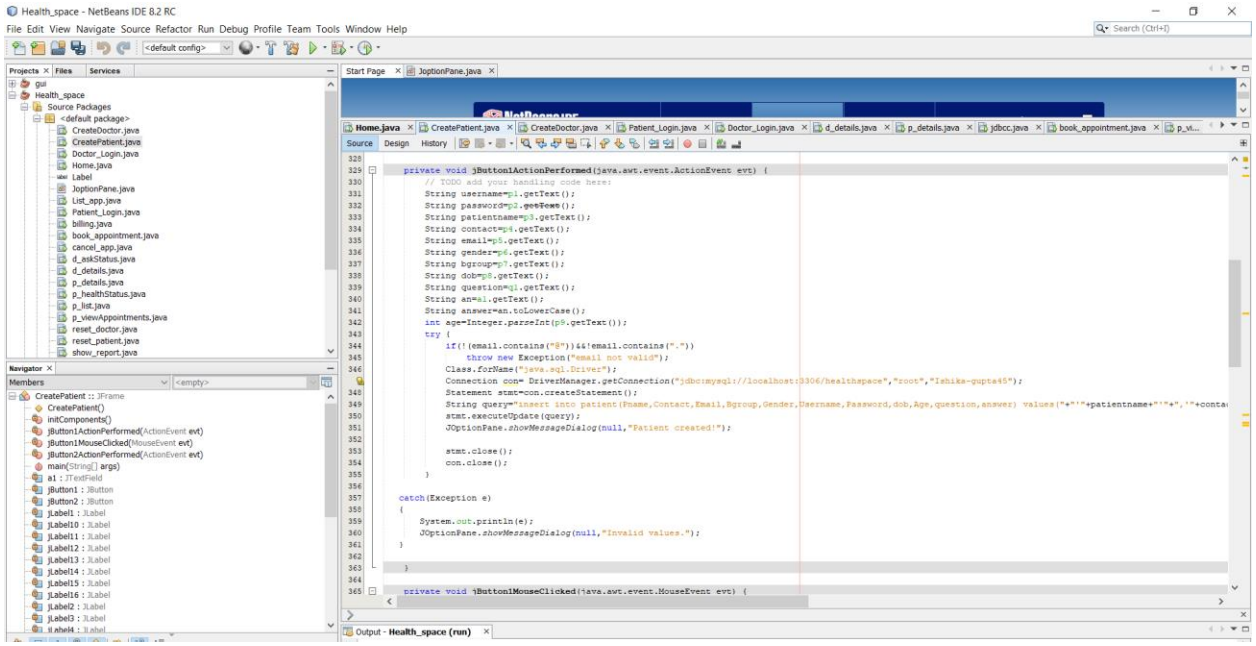


Fig 4.9: Create patient code snippet

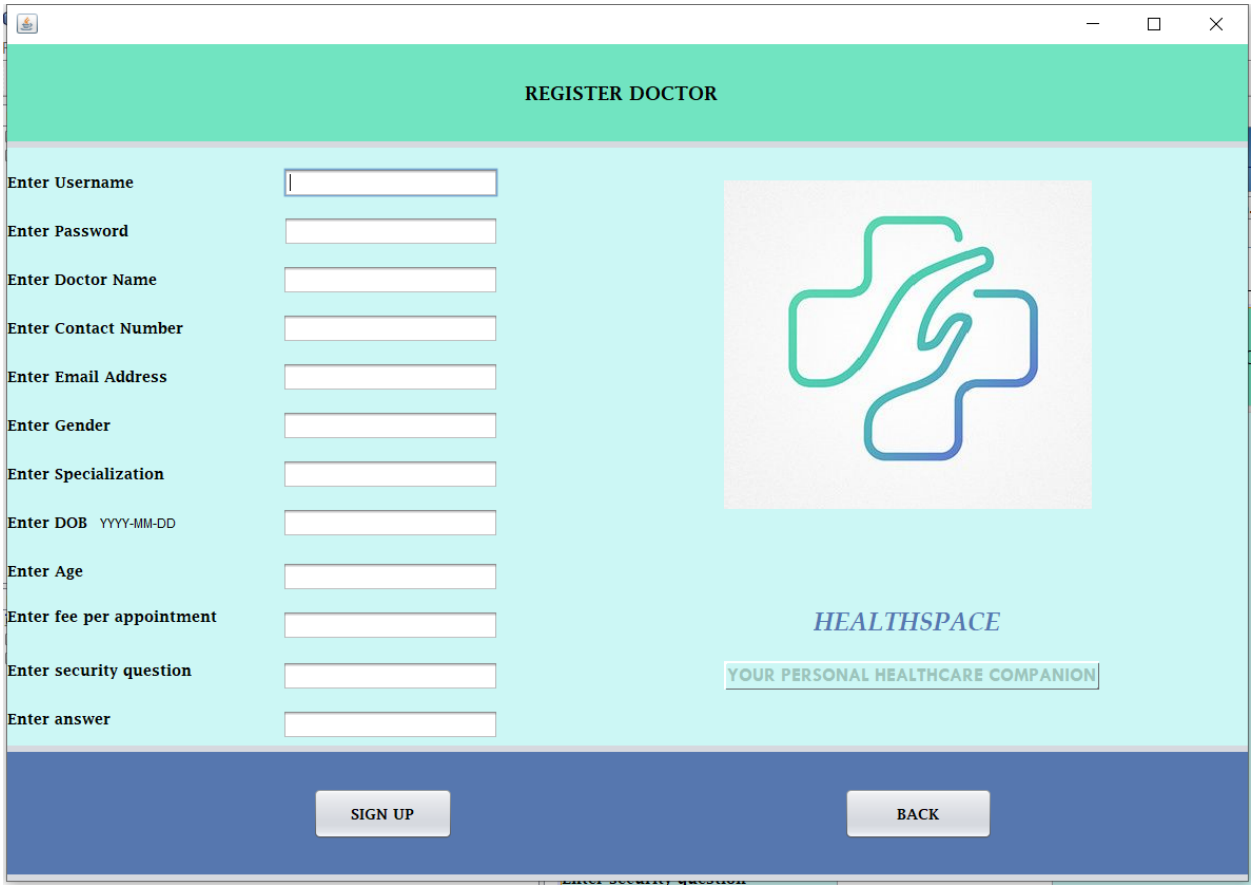


Fig 4.10: Create doctor

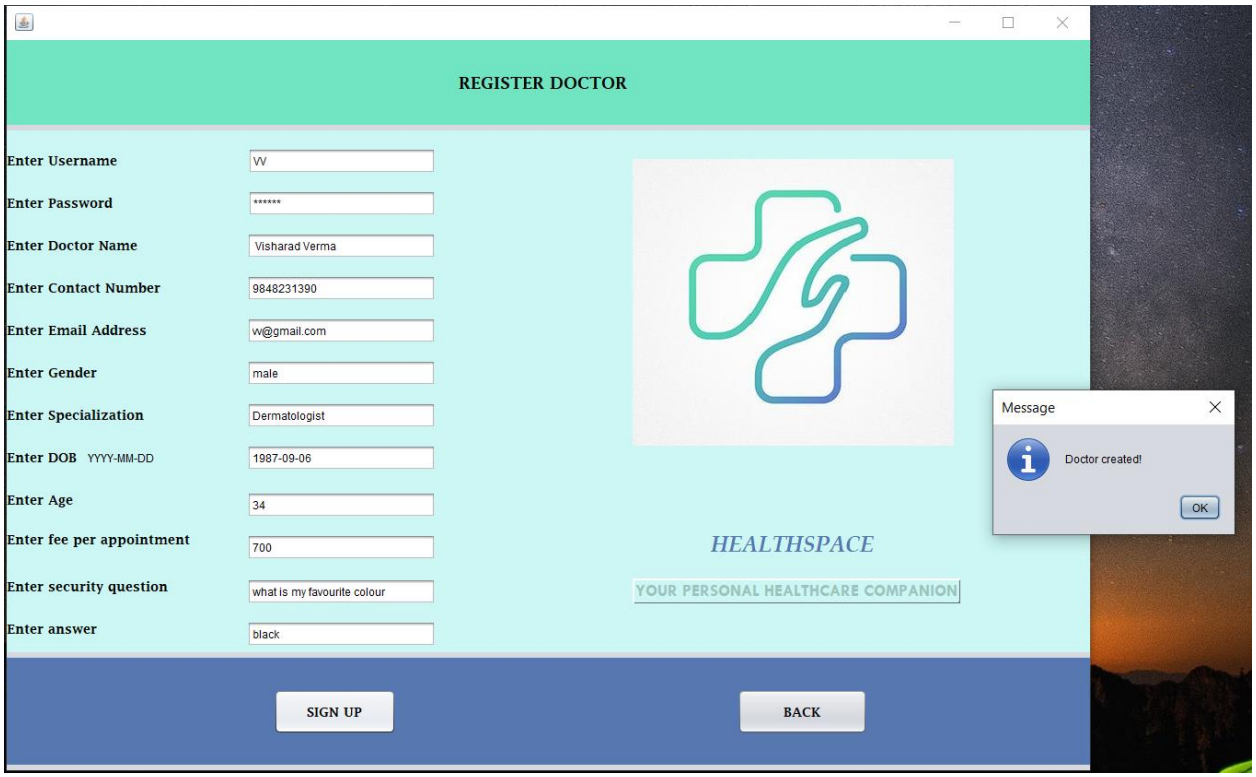


Fig 4.11: Doctor created

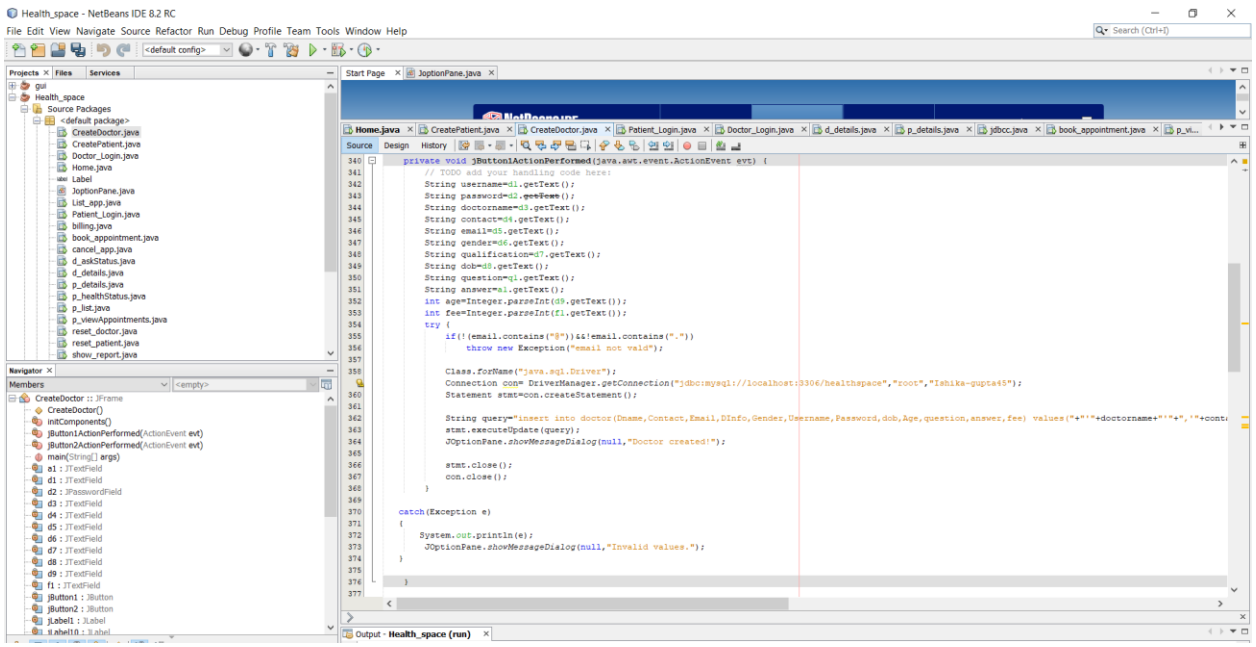


Fig 4.12: Create doctor code snippet

If an existing user forgets his/her password, the 'Forgot Password' button is present to assist them. Depending on whether the user is a patient or a doctor, the user must choose the appropriate 'Forgot Password' button. This frame asks the user for his/her ID which then accesses the security question the user entered when his/her account was created in the first place. With the security question displayed, the user is required to enter the correct answer and their new password. If the answer matches with the one present in the database, the password update is successful otherwise it is invalidated.

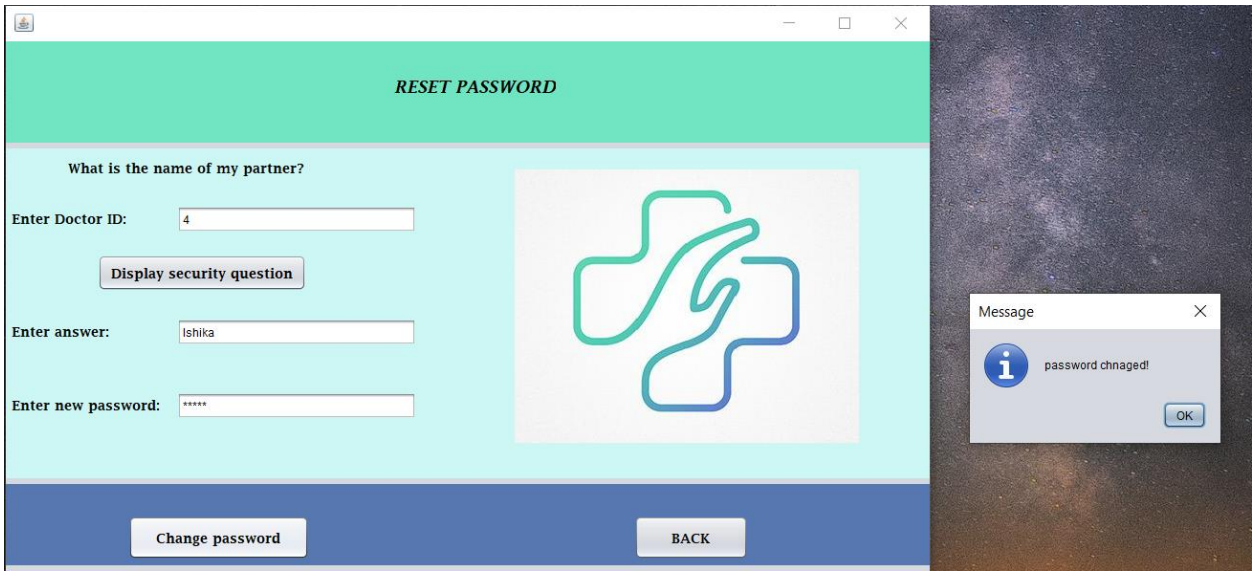


Fig 4.13: Reset doctor password

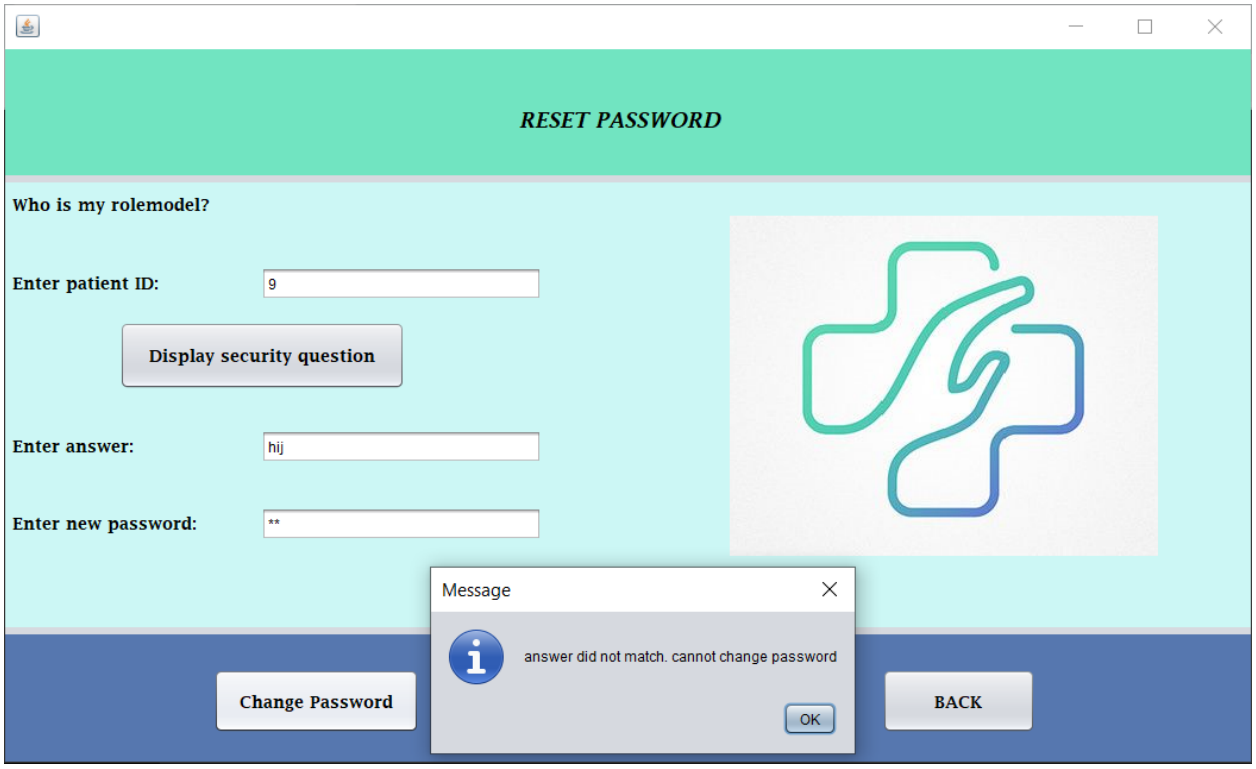


Fig 4.14: Invalid password change

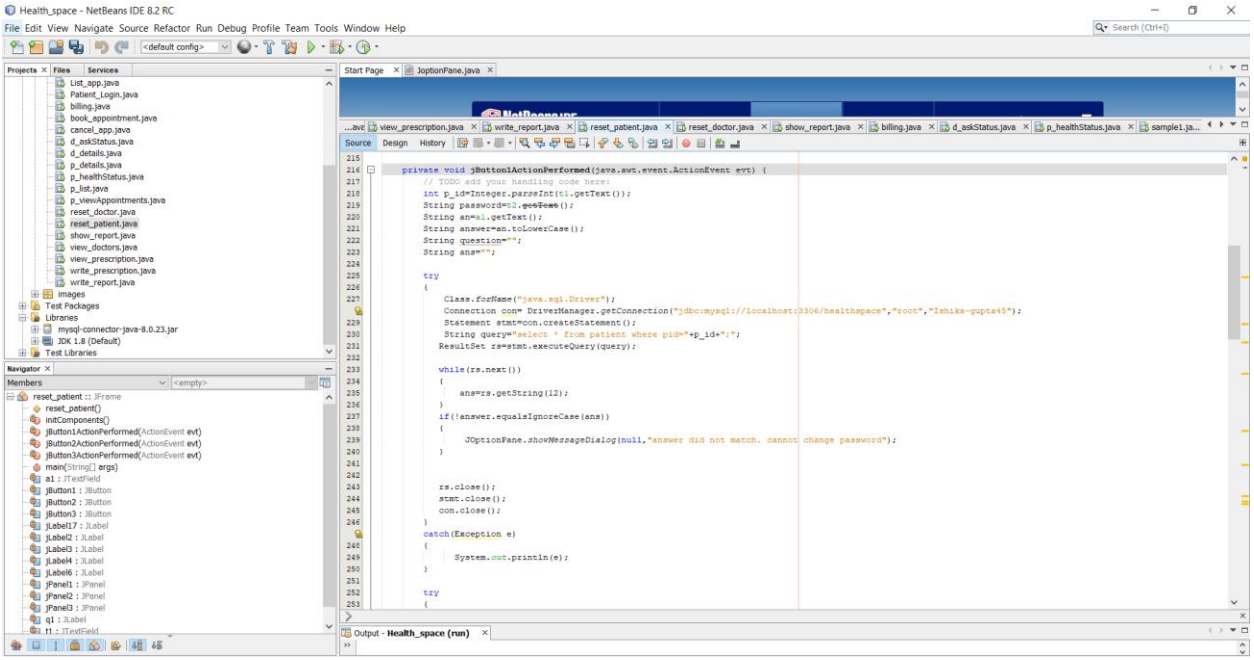


Fig 4.15: Reset password code snippet 1

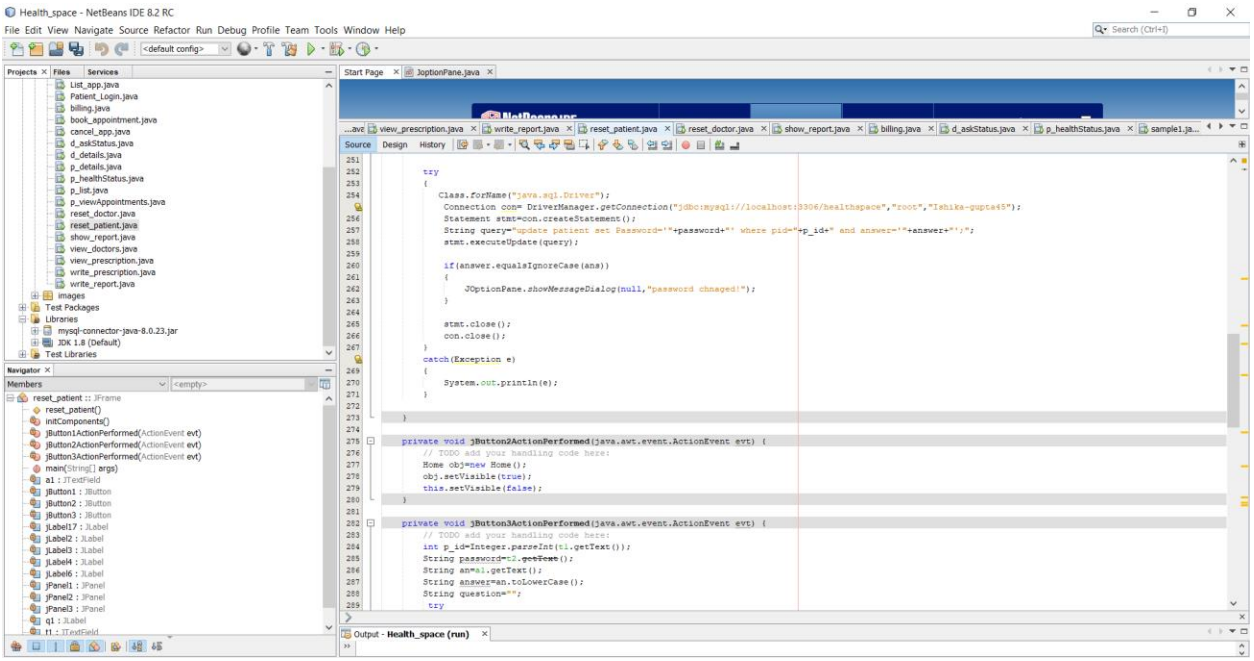
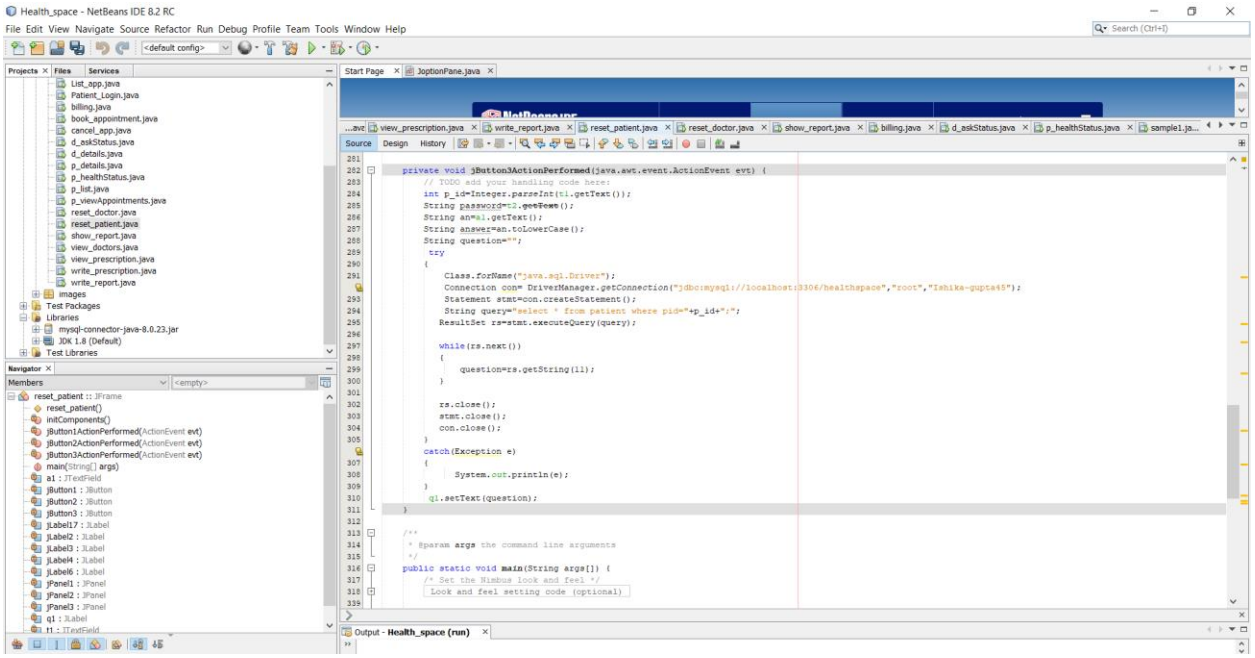


Fig 4.16: Reset password code snippet 2



The Patient Login page contains the several features a patient has access to. These features are,' View My Details', 'View Your Appointments', 'View Doctors', 'Book an Appointment', 'Cancel your appointment', 'Update health status', 'View Report' and 'View Your Prescription'.

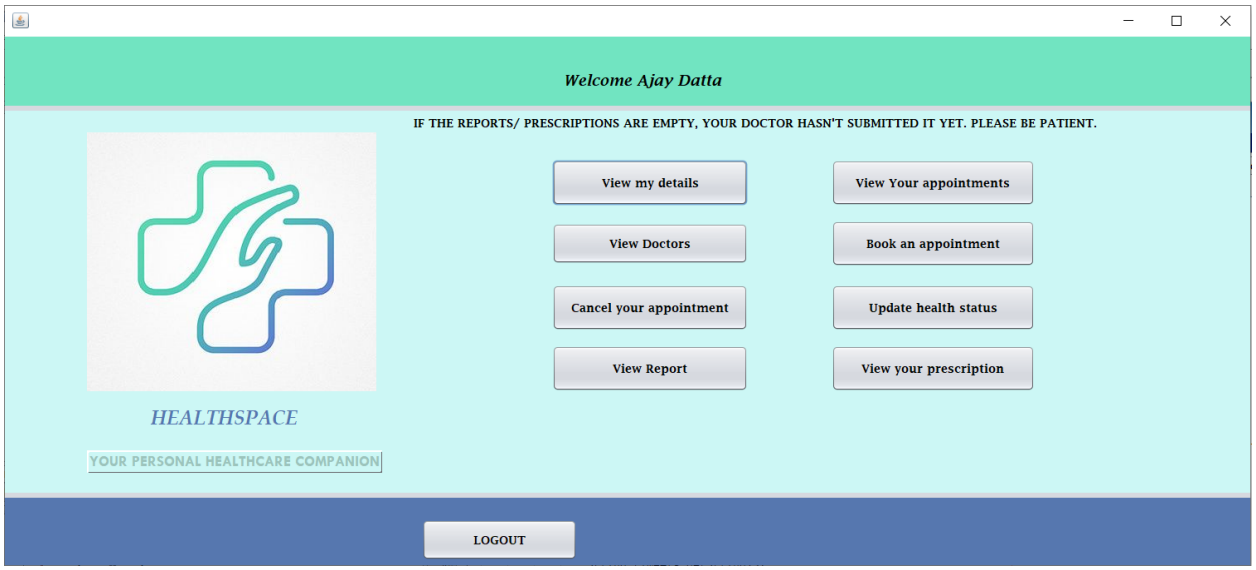


Fig 4.17: Patient login features

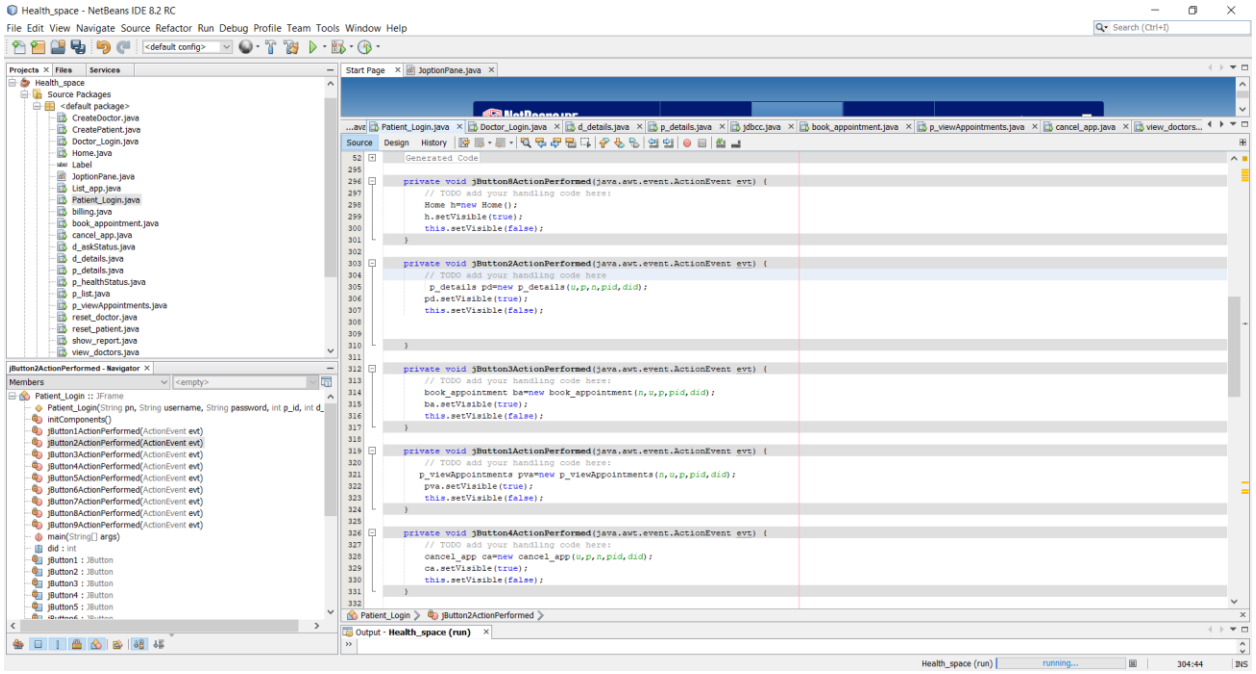


Fig 4.18: Patient login code snippet

The Patient Login page contains the several features a patient has access to. These features are,' View My Details', 'List of patients, 'List of appointments', 'Write Report' and 'Write Prescription'. The logout button logs the user out of their account.

Fig 4.19: Doctor login features

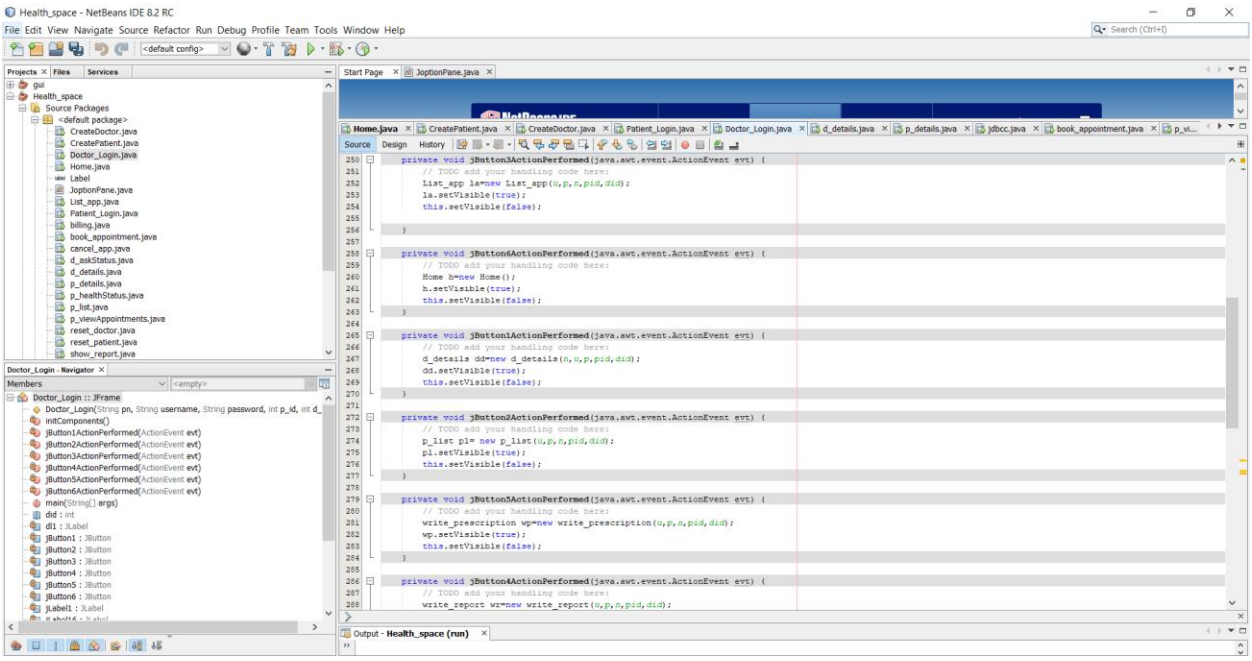


Fig 4.20: Doctor login code snippet

The Patient/Doctor details page displays all the information about the user. This frame comes with the 'Update Information' feature where if the user wishes to change or update any of the information about themselves, they can make changes in the respective text fields and click on 'Update Information' button. The changes will be reflected in the database.

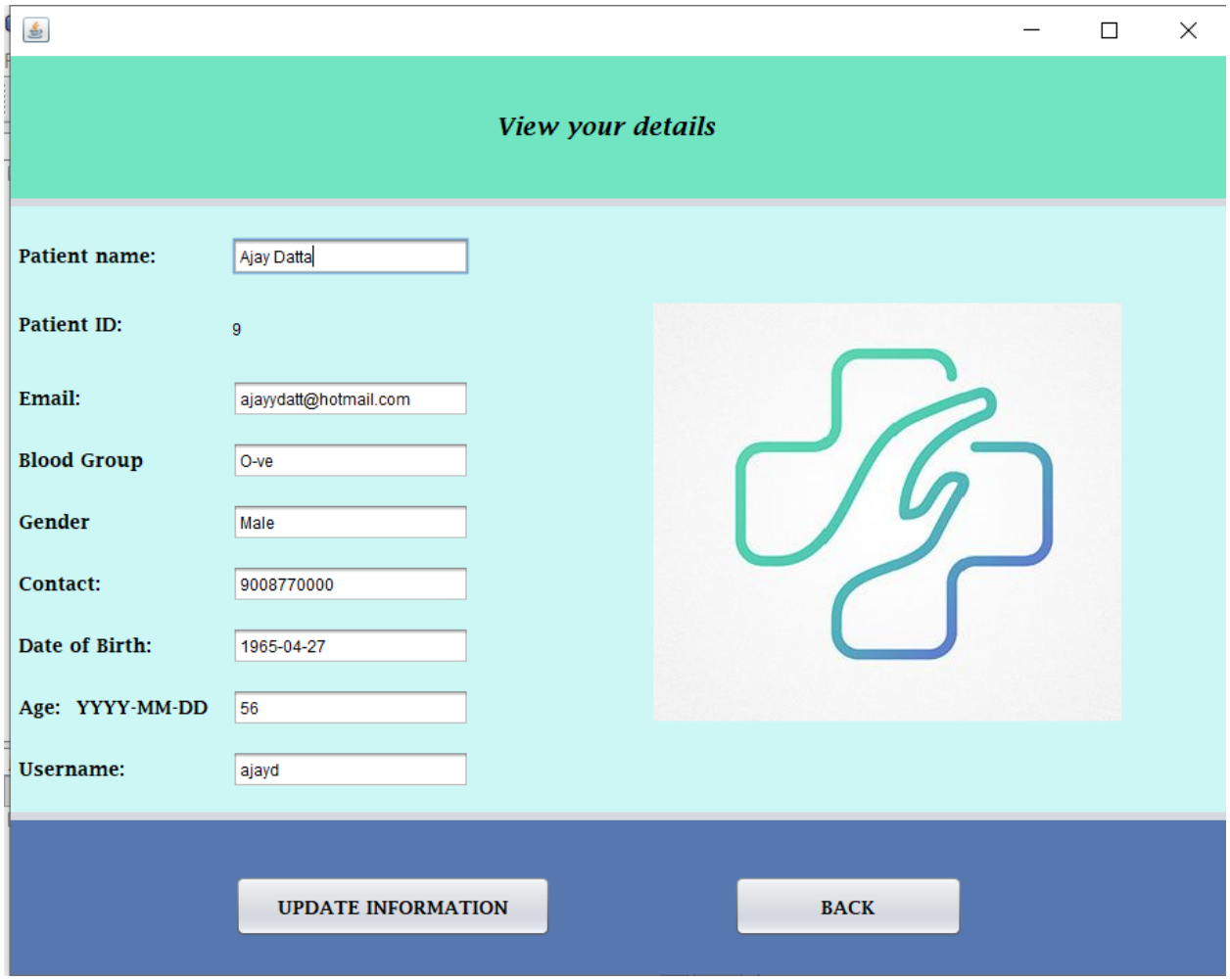


Fig 4.21: Patient details

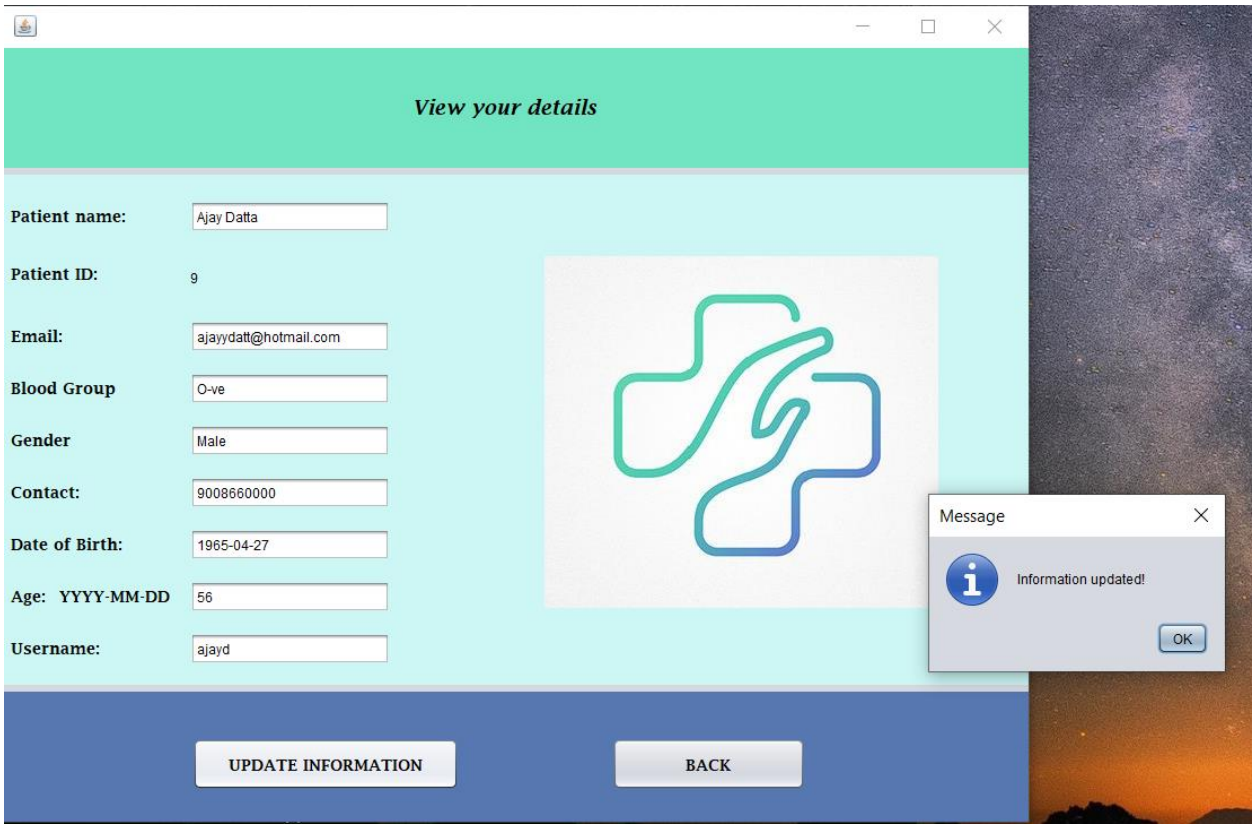


Fig 4.22: Updating patient details

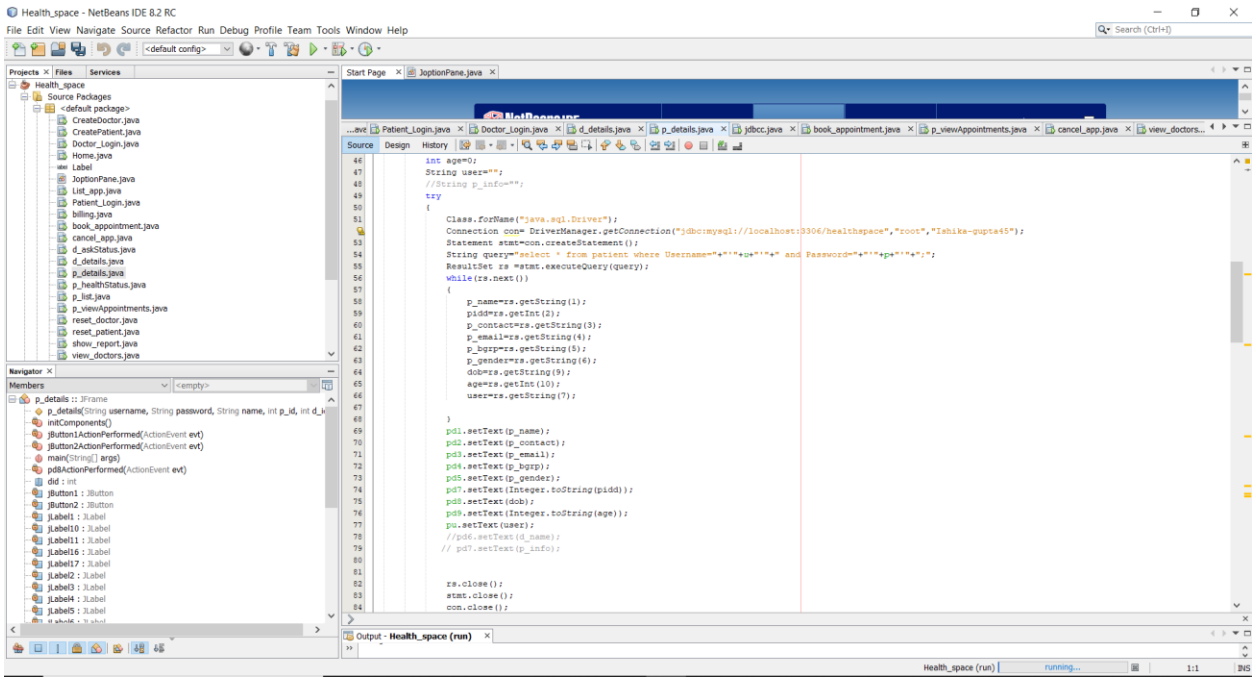


Fig 4.23: Patient details code snippet

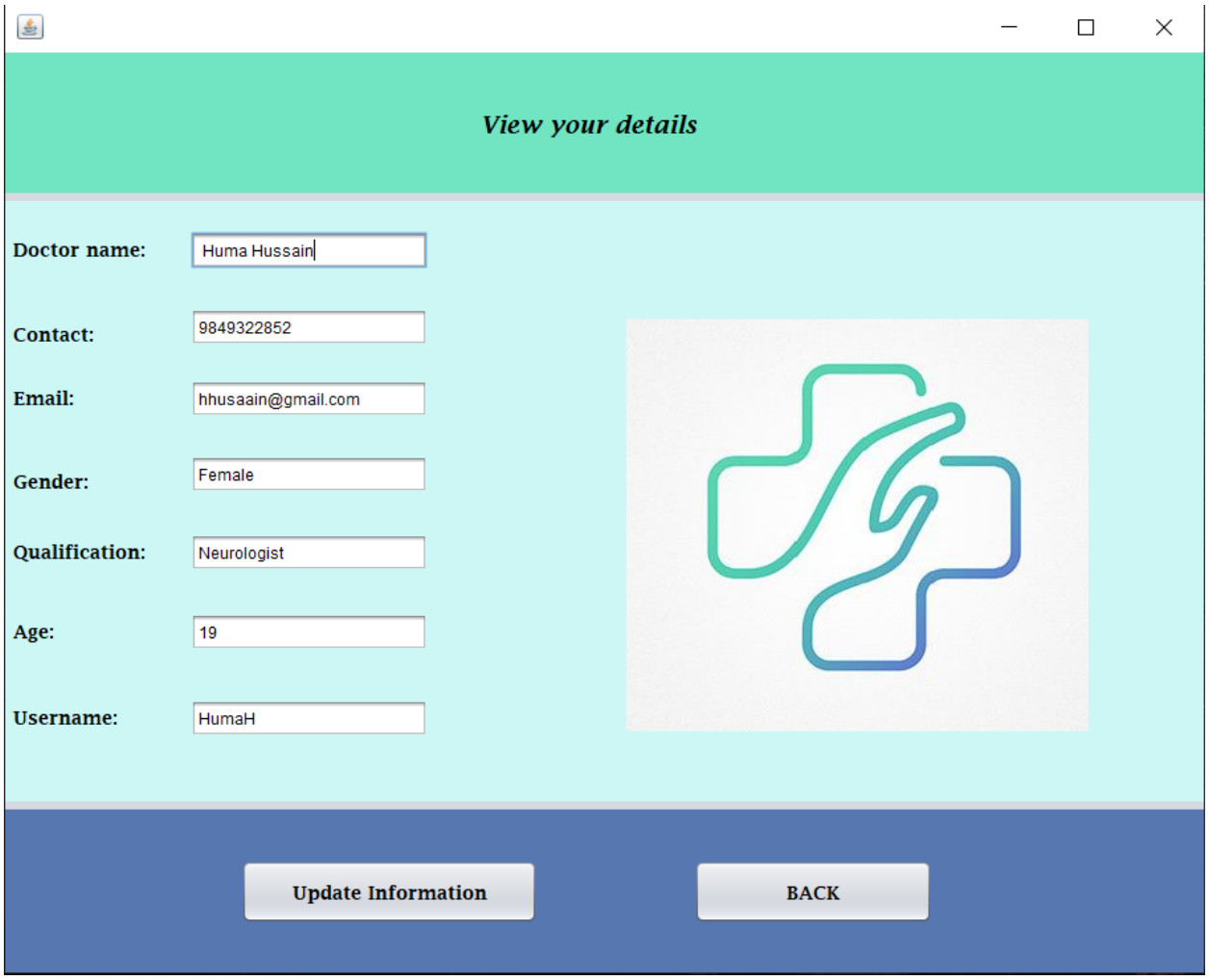


Fig 4.24: Doctor details

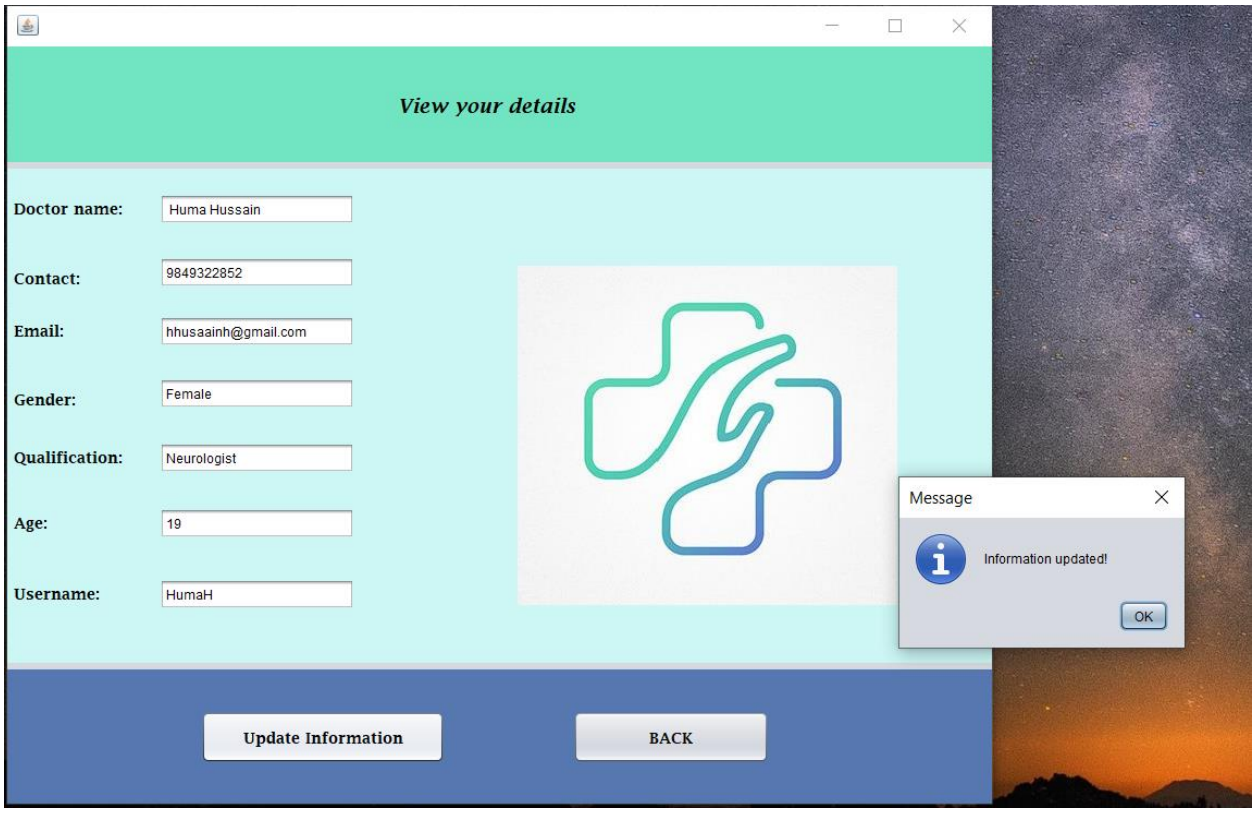


Fig 4.25: Doctor details update

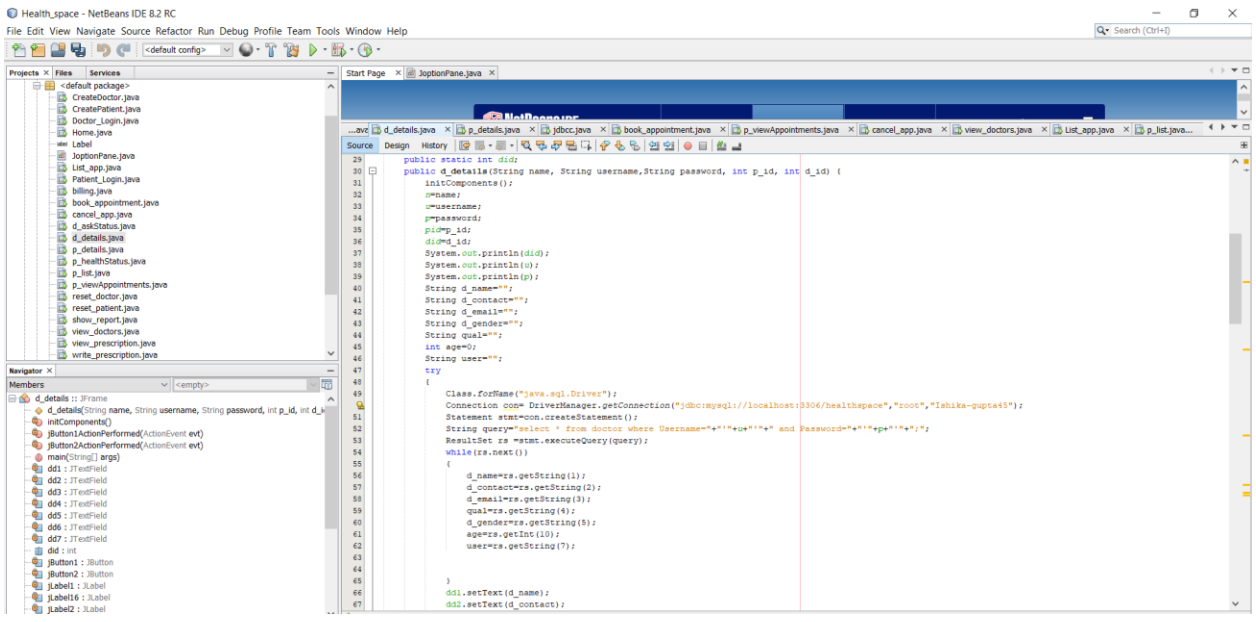


Fig 4.26: Doctor details code snippet

The ‘View Doctors’ feature in the patient login portal displays all the details of all the doctors present in the database for the patient to view. With this feature, the patient can view the qualifications of the doctors and book an appointment with a doctor of their liking.

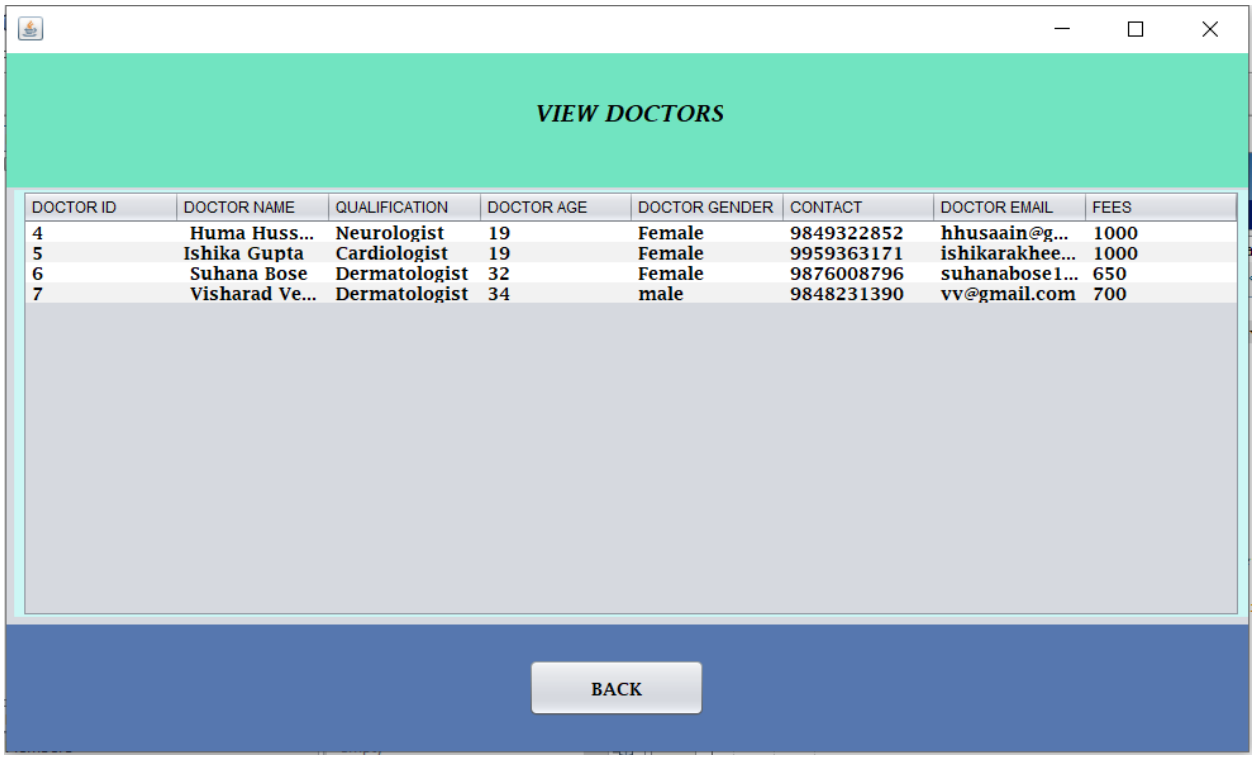


Fig 4.27: View doctors

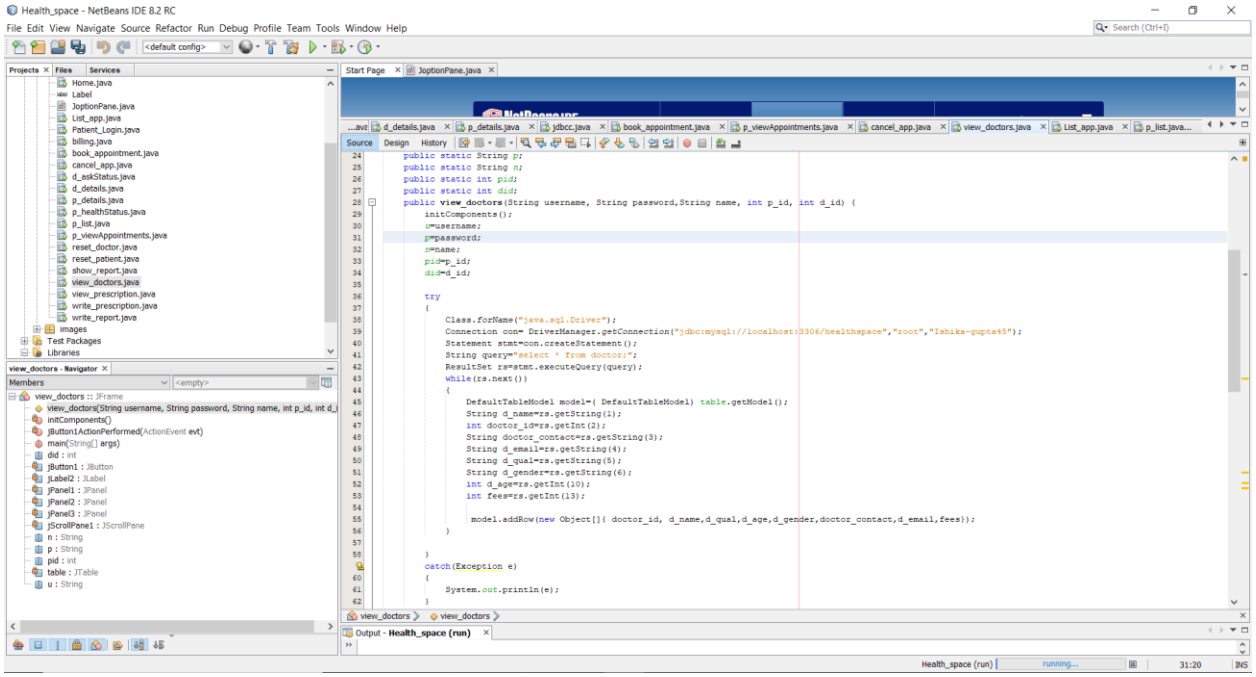


Fig 4.28: View doctors code snippet

The 'List of Patients' feature enables the doctor to view all the patients present in the database. It contains two tables; the first table contains basic information about the patient like their name and patient ID. If the doctor wishes to know further about the patient, they can insert their patient ID in the given text field and all the details about the patient are displayed in the second table. This frame makes use of the information provided in the Patient table.

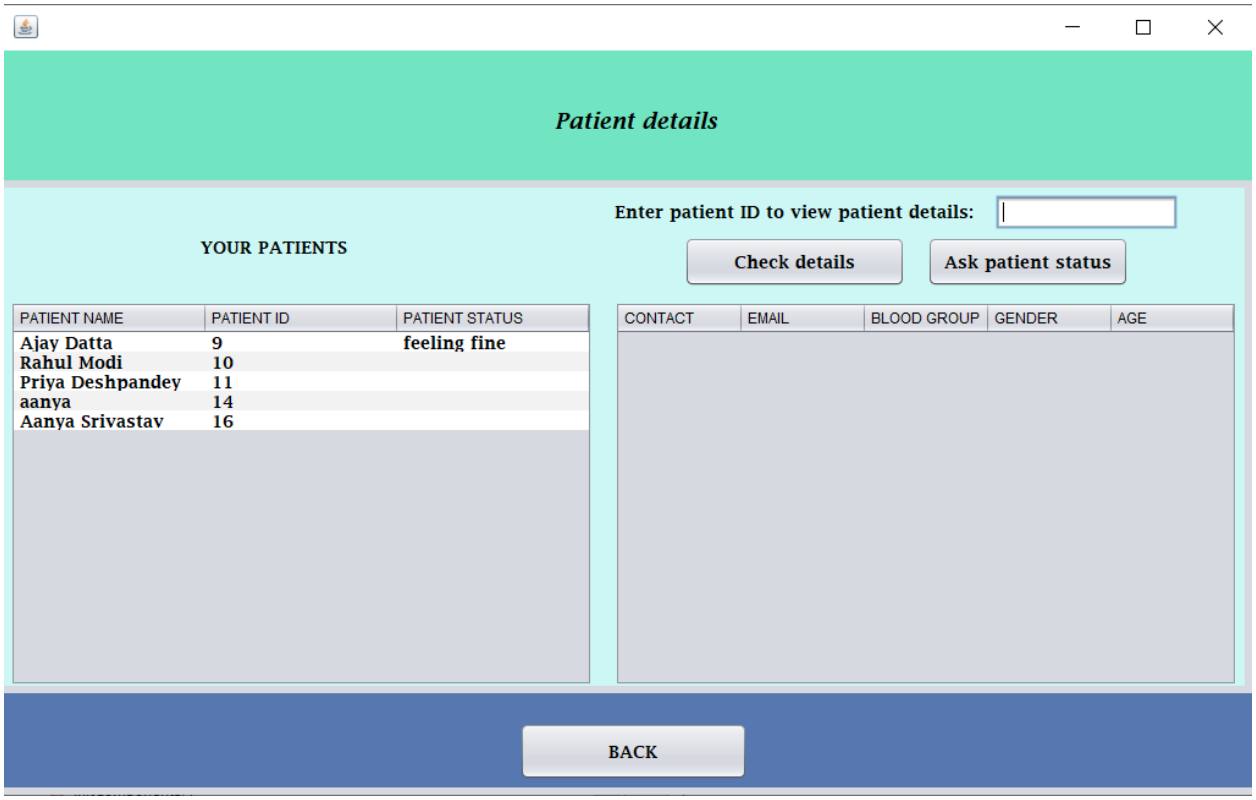


Fig 4.29: List of patients

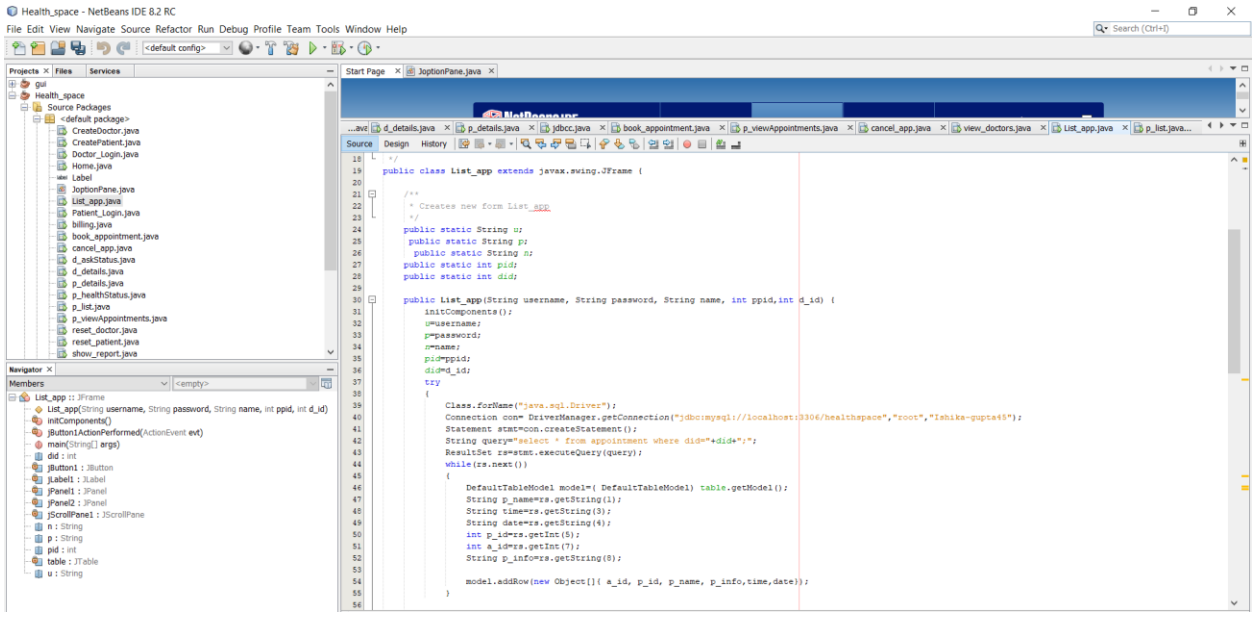


Fig 4.30: List of patients code snippet

The ‘Ask Patient Status’ button in the ‘List of Patients’ frame enables the doctor to have a one-on-one, efficient conversation with the patient about their wellbeing. This input is added to the Appointment table.

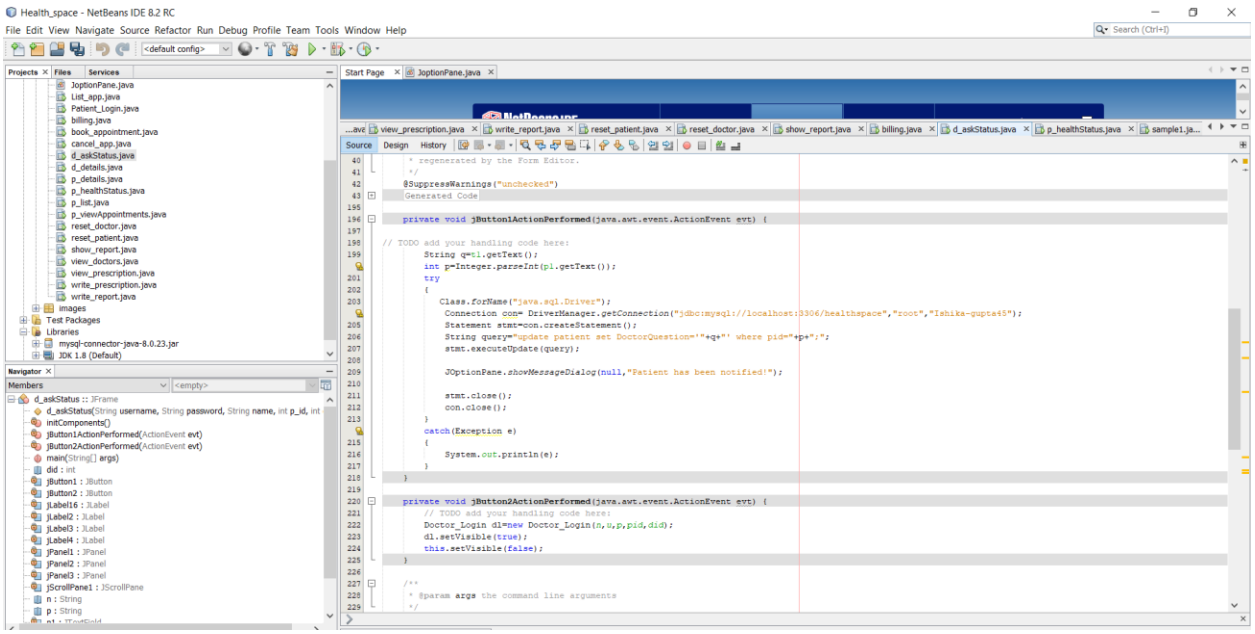


Fig 4.31: Ask patient code snippet

The ‘Update Health Status’ feature in the patient login portal creates a direct connection between the patient and the doctor. This feature is analogous to a chat feature between the patient and a doctor. A question that has been asked by a doctor to a patient using the ‘Ask Patient Status’ feature is projected in the patient’s portal in this frame. The patient can reply whatever’s relevant to the question and the answer will be reflected in the first table in the ‘List of Patients’ frame in the doctors portal. This feature is prime is creating a more personal bond between the doctor and the patient.

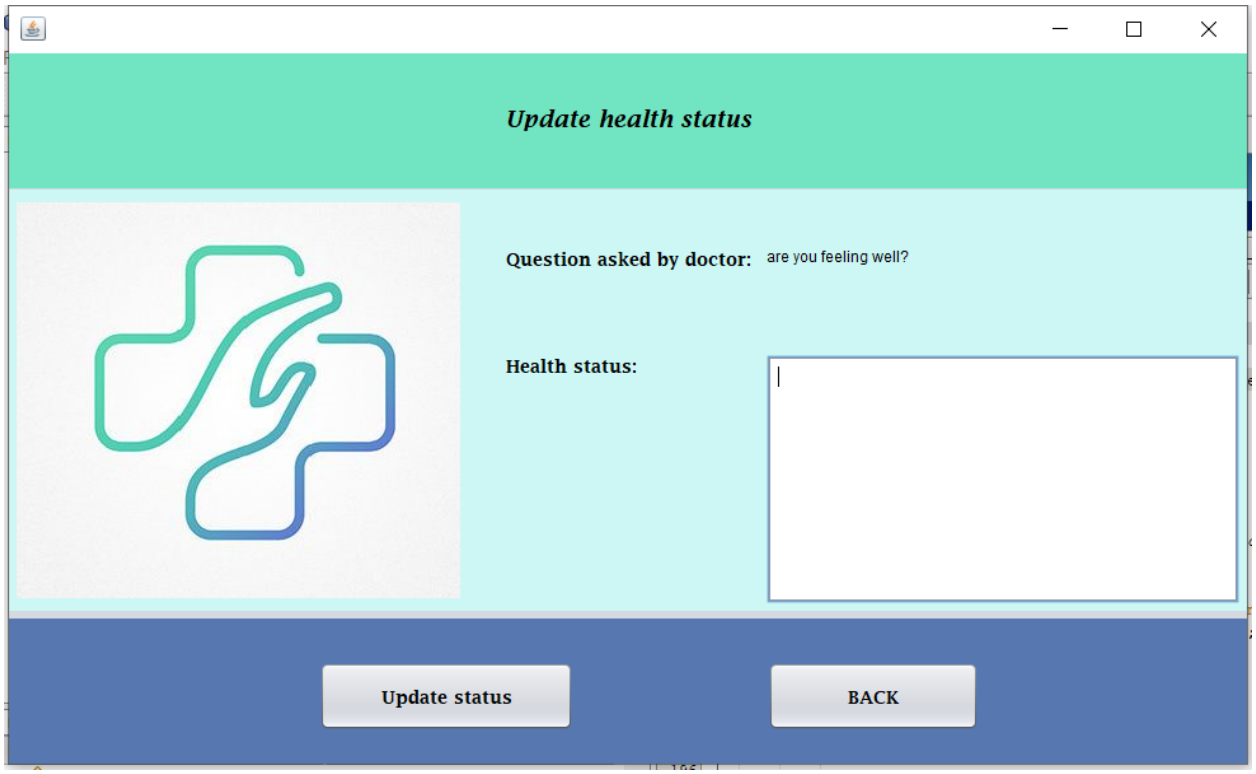


Fig 4.32: Update health status

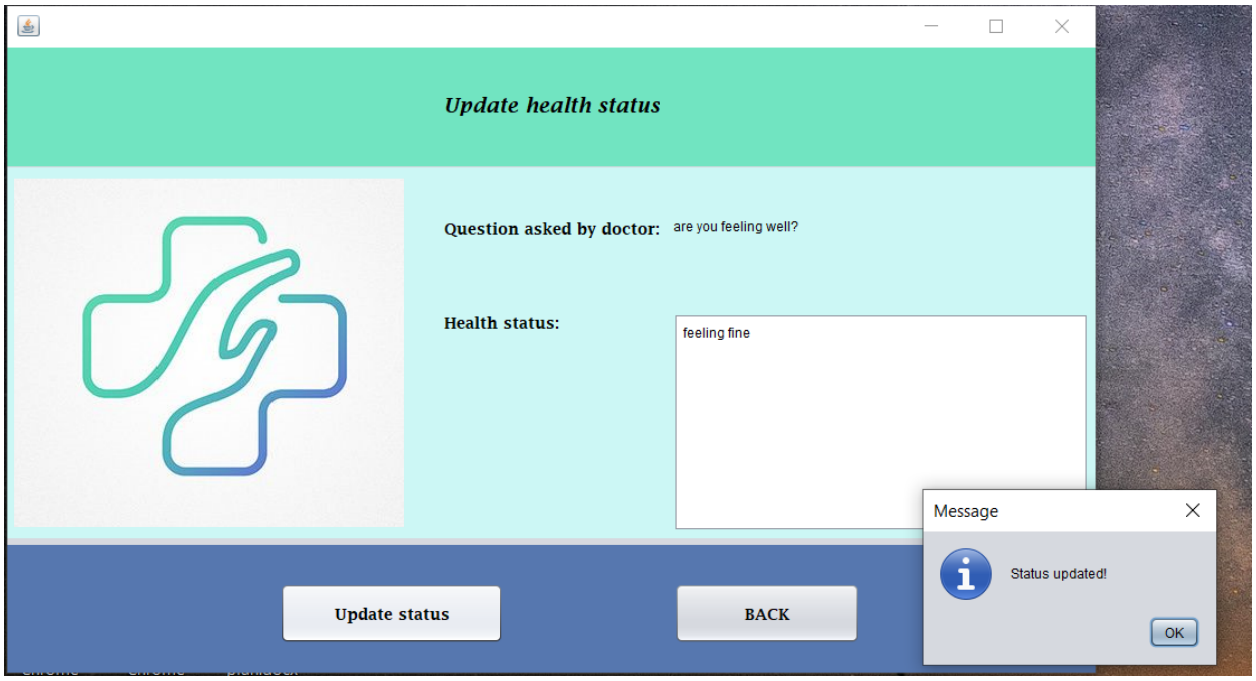


Fig 4.33: Updating health status

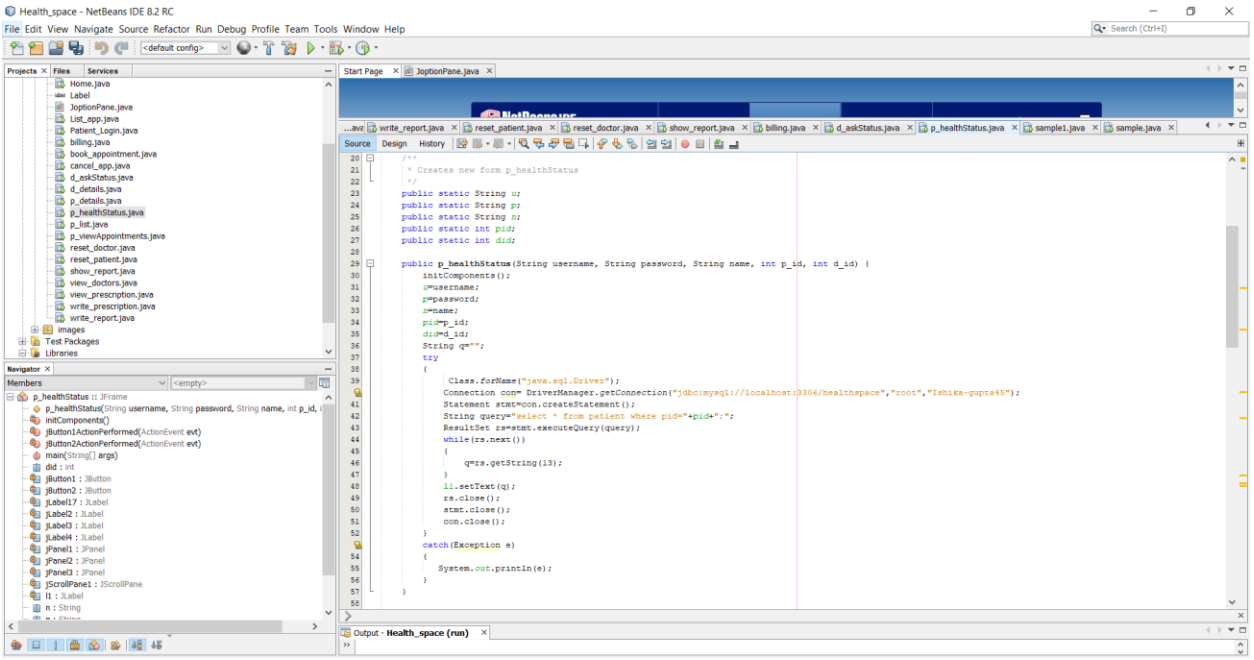


Fig 4.34: Update health status code snippet 1

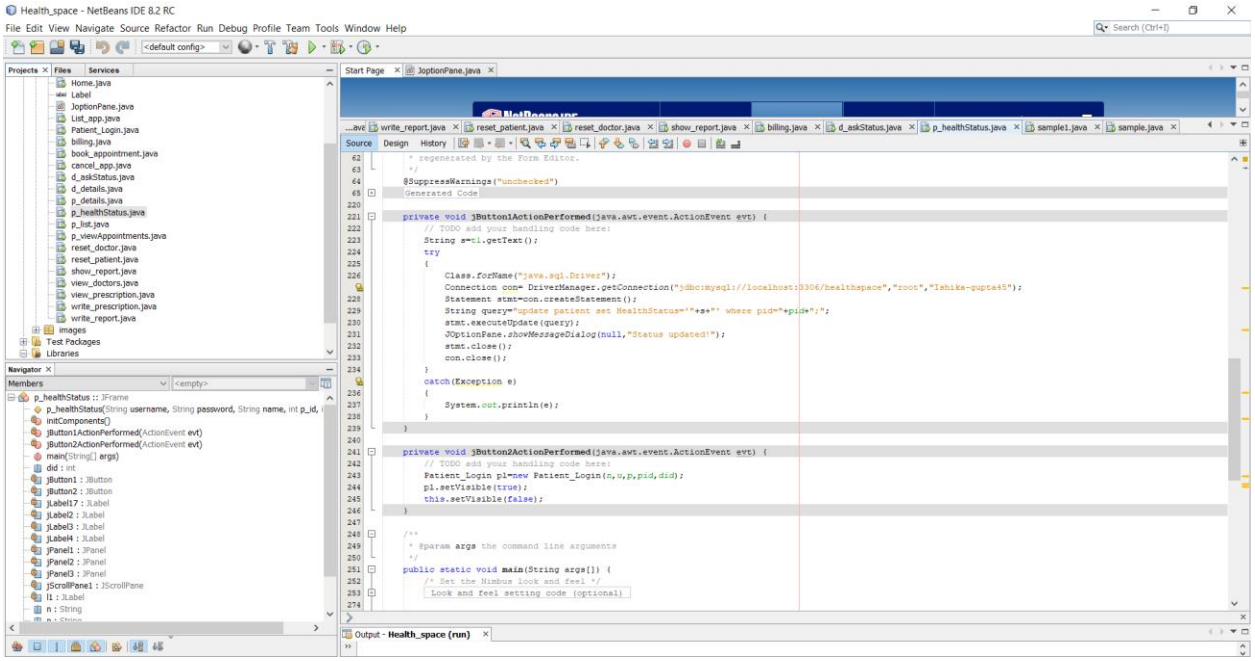


Fig 4.35: Update health status code snippet 2

The 'View Your Appointments' page in the patient login portal displays a table containing all the information like appointment ID about a patient's future appointments that have been booked. All of this information is stored in the Appointment table.

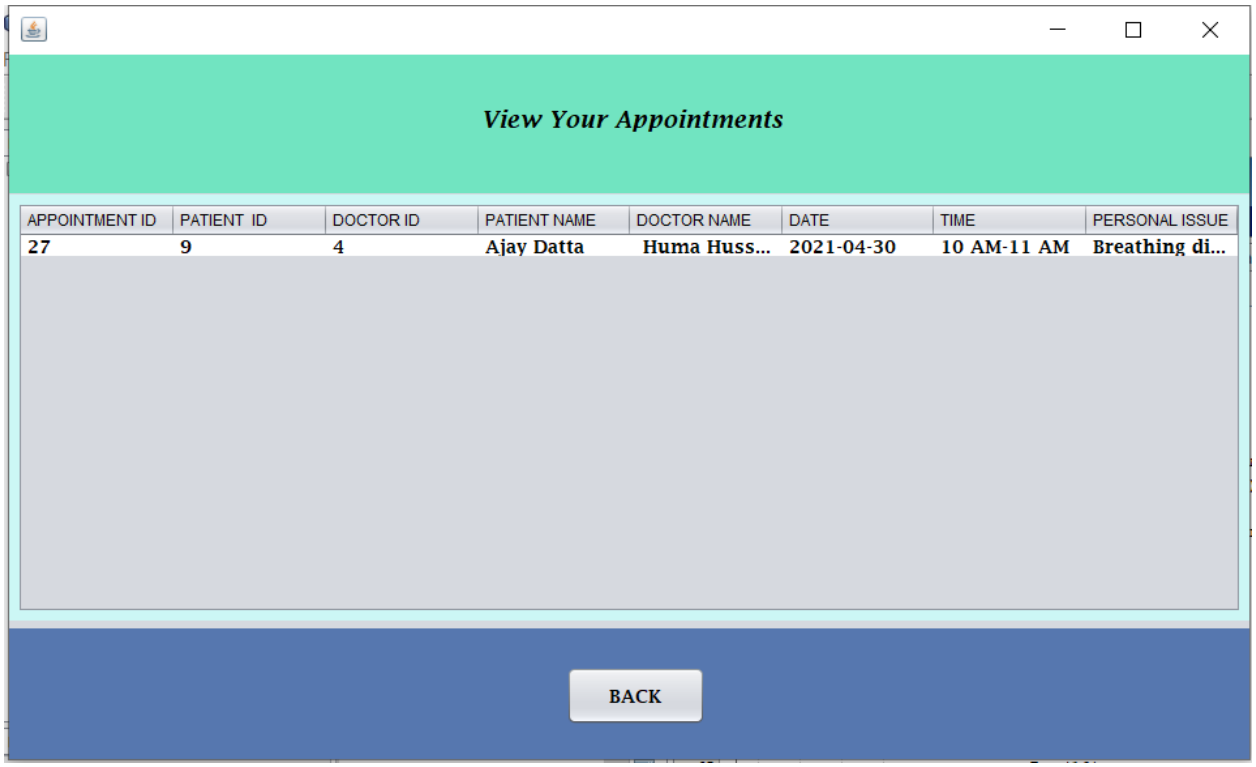


Fig 4.36: Patient's appointments

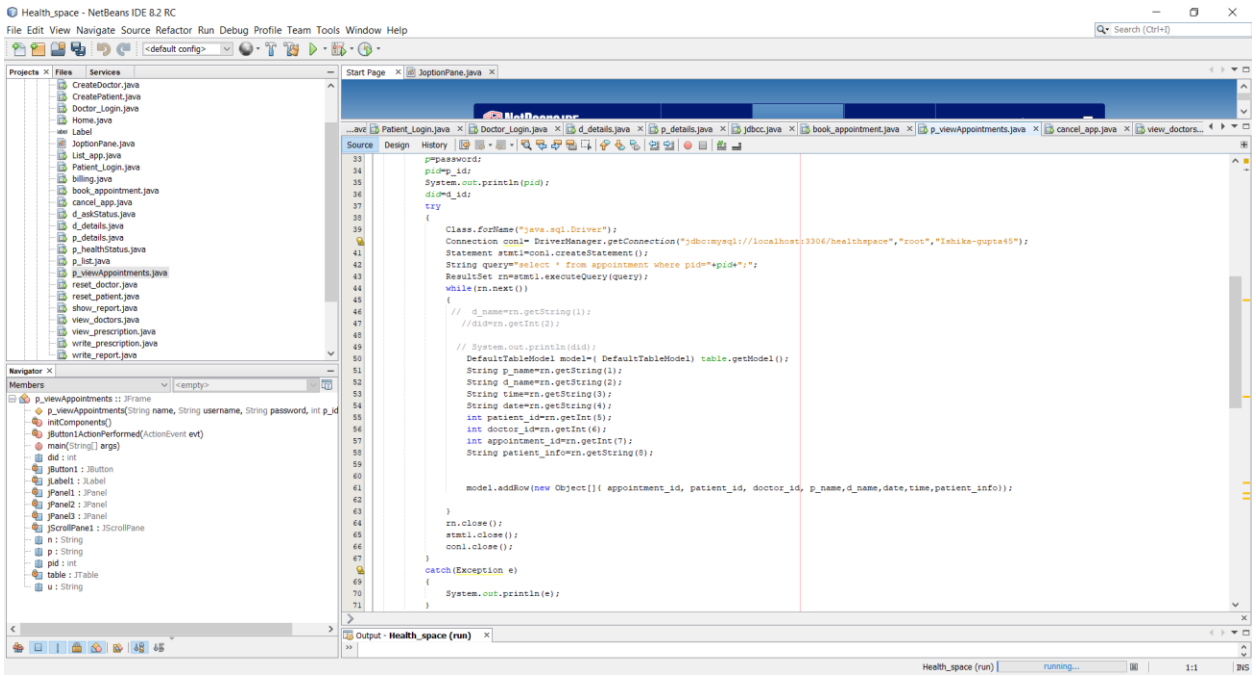


Fig 4.37: Patient's appointments code snippet

The 'List of Appointments' frame in the doctor's portal contains all the information taken from the Appointment table about all the appointments that have been booked for the future by a patient.

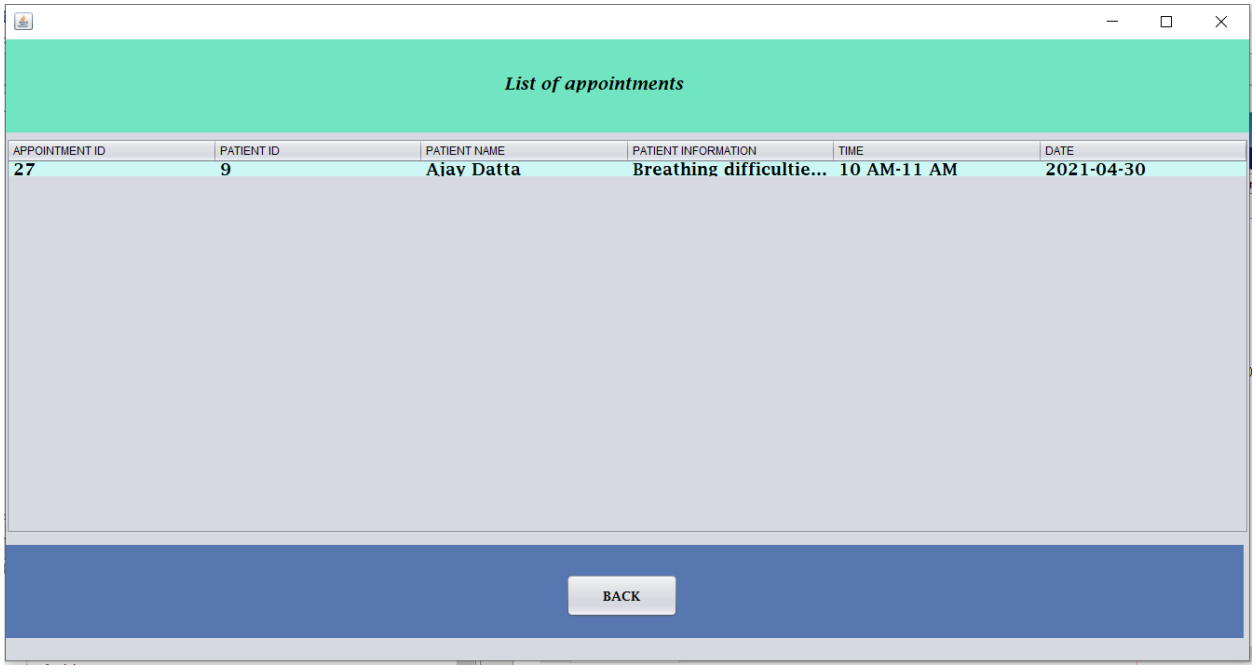


Fig 4.38: Doctor's appointments

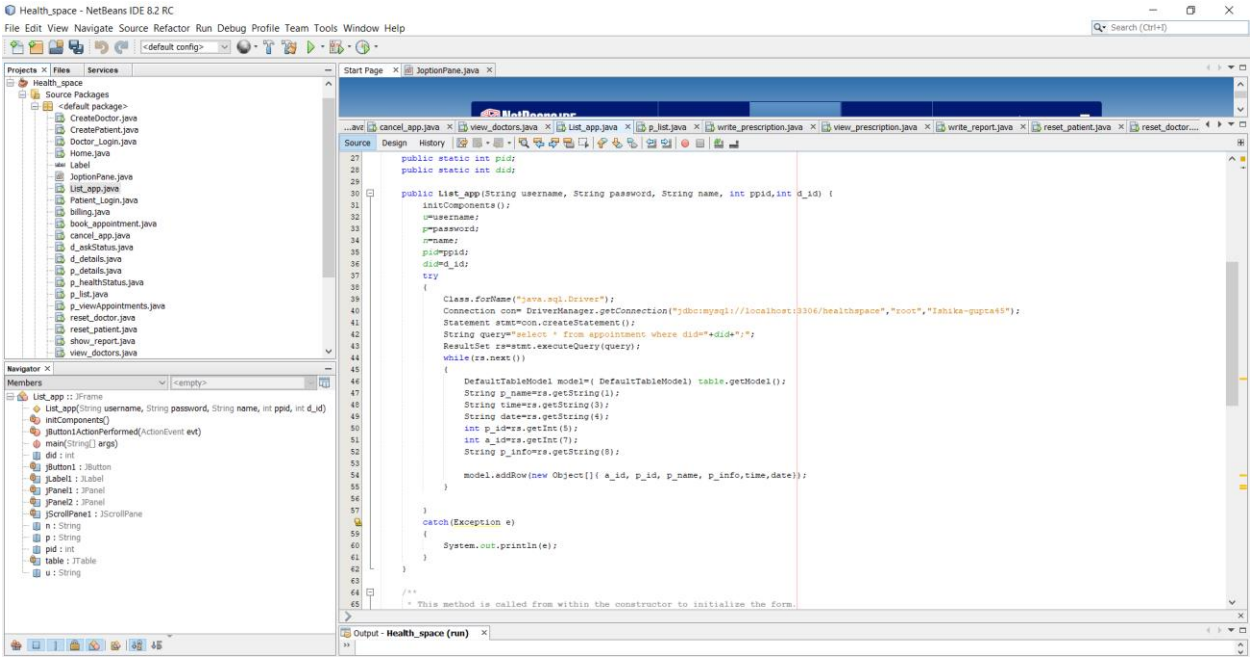


Fig 4.39: Doctor's appointments code snippet

The 'Book Appointment' feature in the patient login portal enables the user to book an appointment with any doctor of their liking (using their doctor ID). In this frame, the user has the freedom to choose the date and time slots for the appointment and they have a textbox that lets the doctor know in-depth about the health problem they are facing. If a patient tries to book a time or date slot for a doctor that has already been booked, a message is popped up invalidating all the information provided by the user, the appointment will not be booked. Once all values are appropriate, all information provided by the user is stored in the Appointment table.

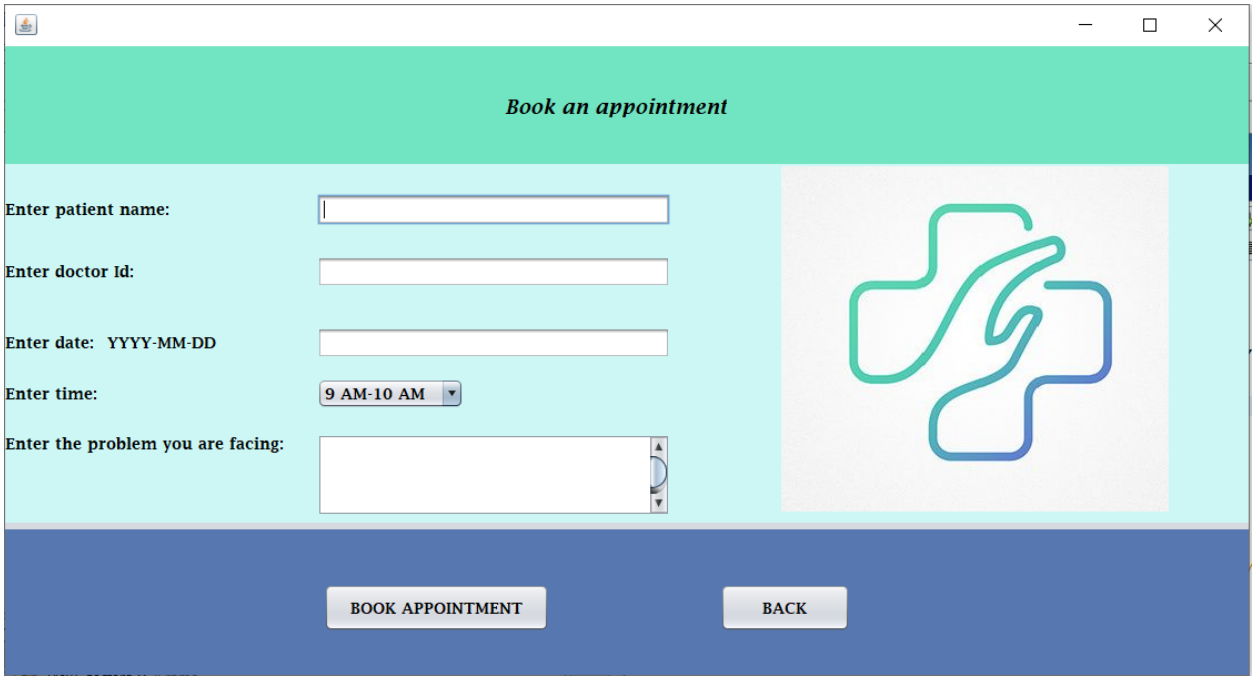


Fig 4.40: Booking an appointment

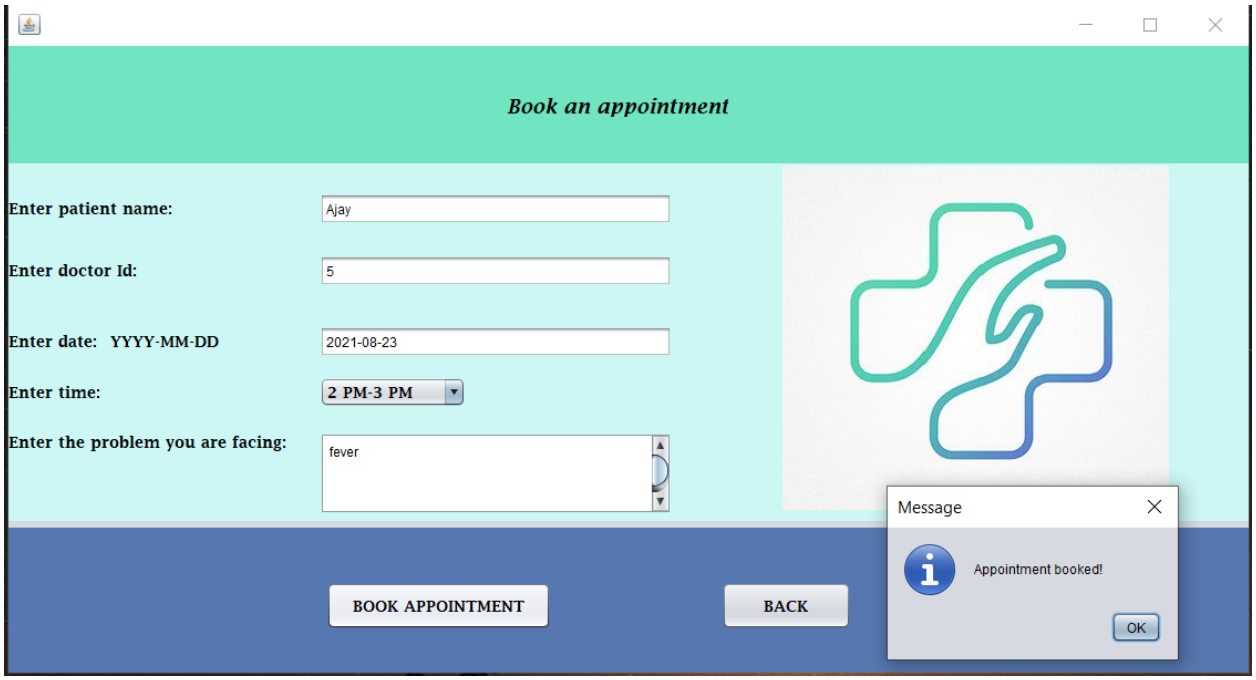


Fig 4.41: Appointment booked

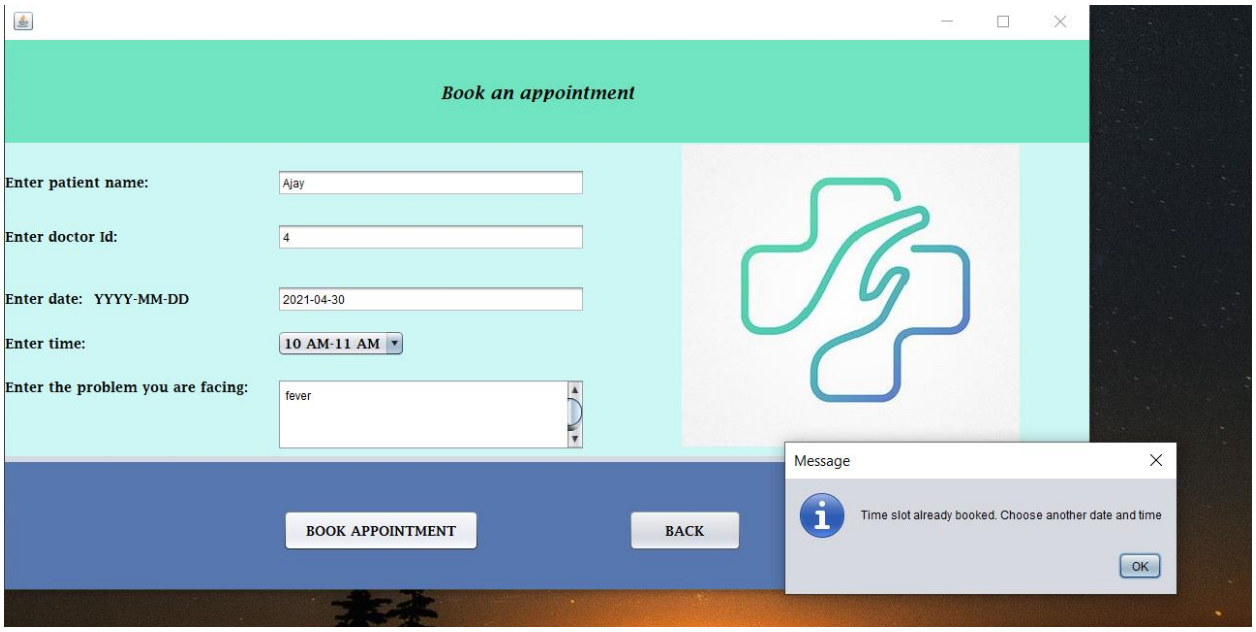


Fig 4.42: Invalid appointment booking

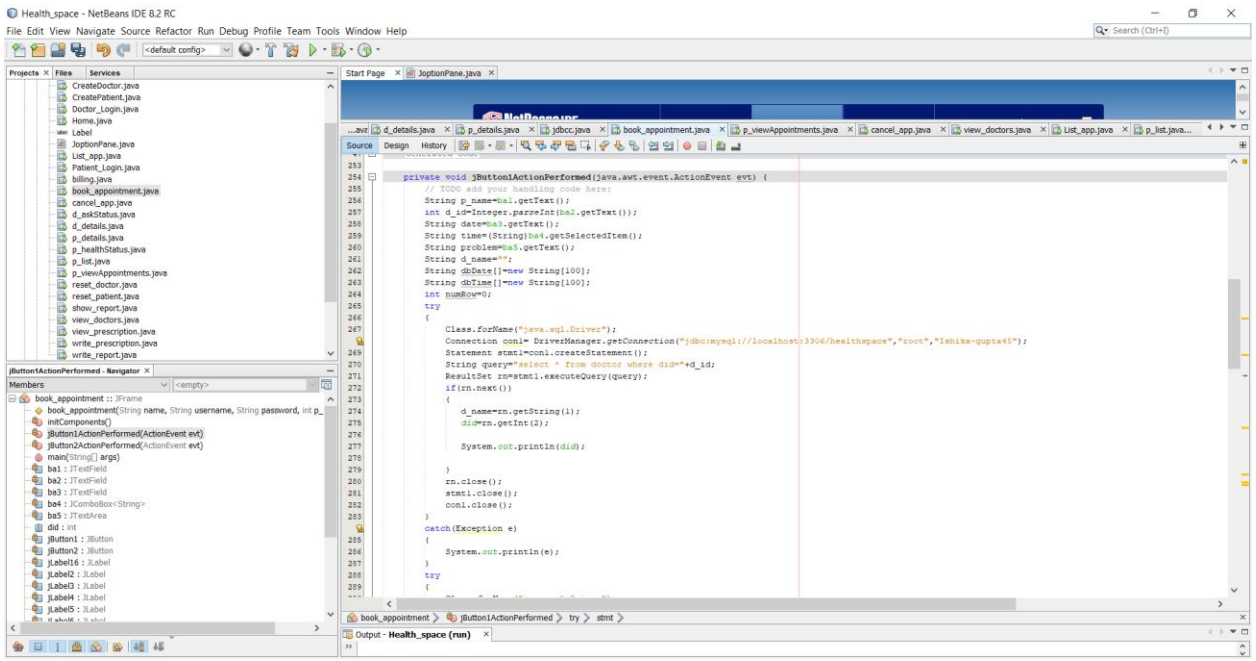


Fig 4.43: Appointment booking code snippet 1

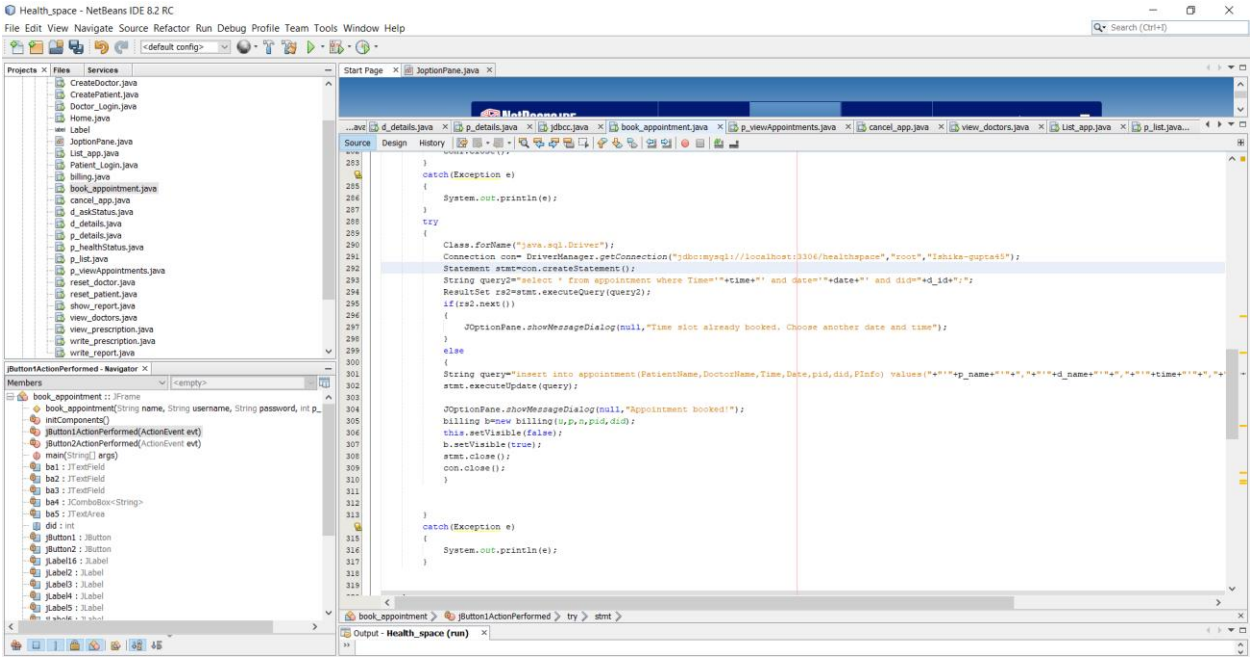


Fig 4.44: Appointment booking code snippet 2

Once the appointment is booked, the user is directly navigated to the payment page where the appointment's bill is displayed. The user is asked to transfer the said amount to the given account number and provide the transaction ID of their payment. Once the transaction ID is validated by clicking the 'Pay fee online' button, a message is popped up that confirms the user's payment. The payment changes are made in the Appointment table.

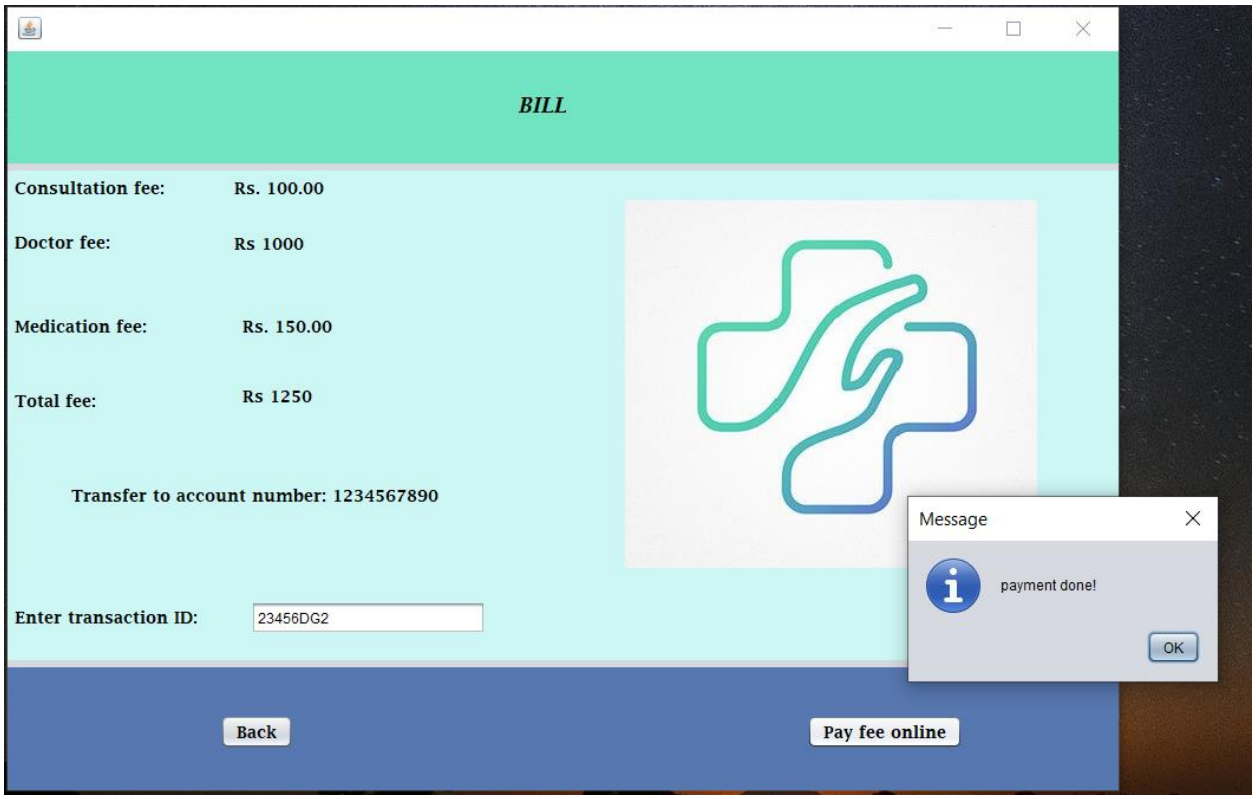


Fig 4.45: Fee payment

The 'Cancel Appointment' feature in the patient login portal enables the user to cancel any appointment they have booked due to any inconvenience. The frame asks for the appointment ID of the appointment they wish to delete which the patient can view from the 'View Your Appointments' feature. Once a valid appointment ID is added, a message is popped up that confirms the cancellation and refunds the amount that was paid during the booking of that appointment.

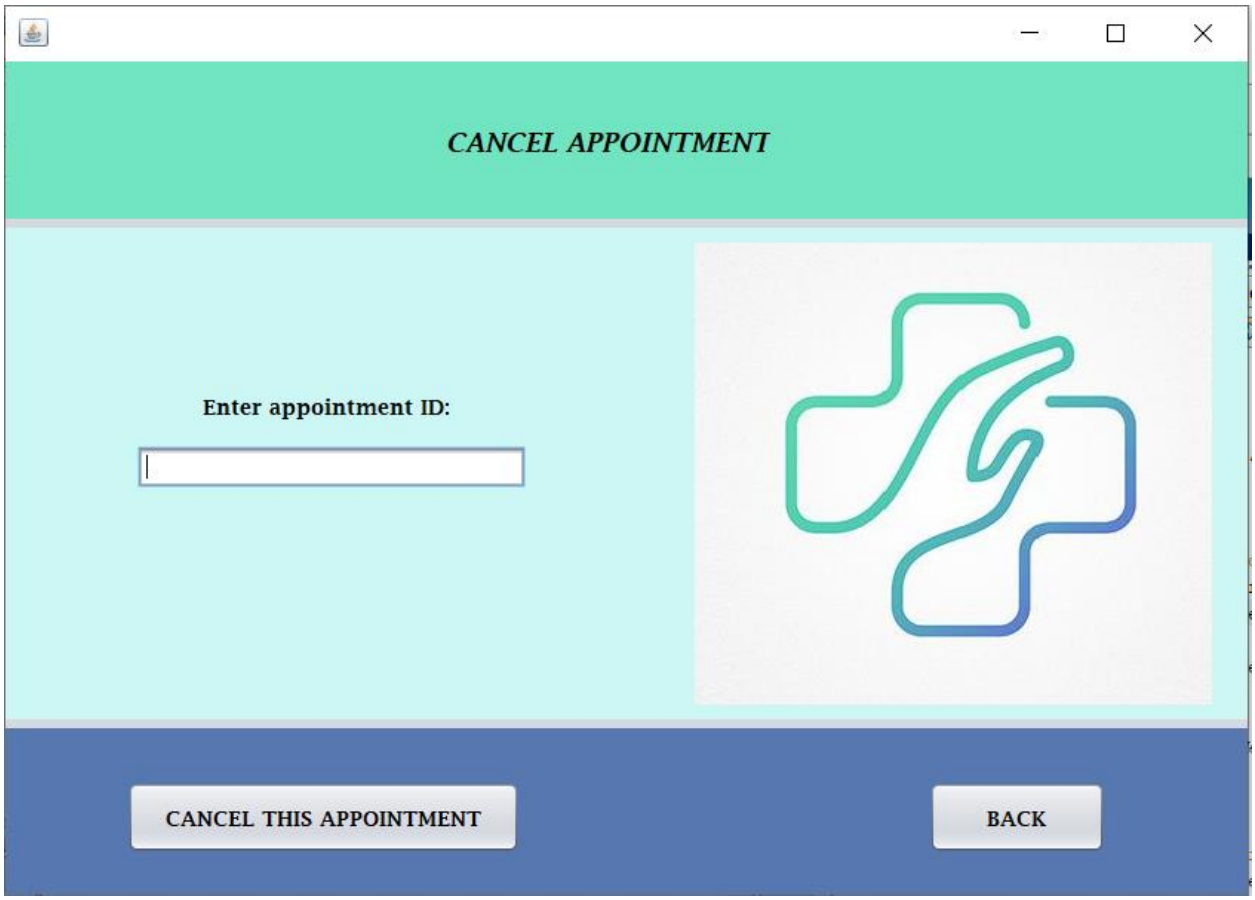


Fig 4.46: Cancelling appointment

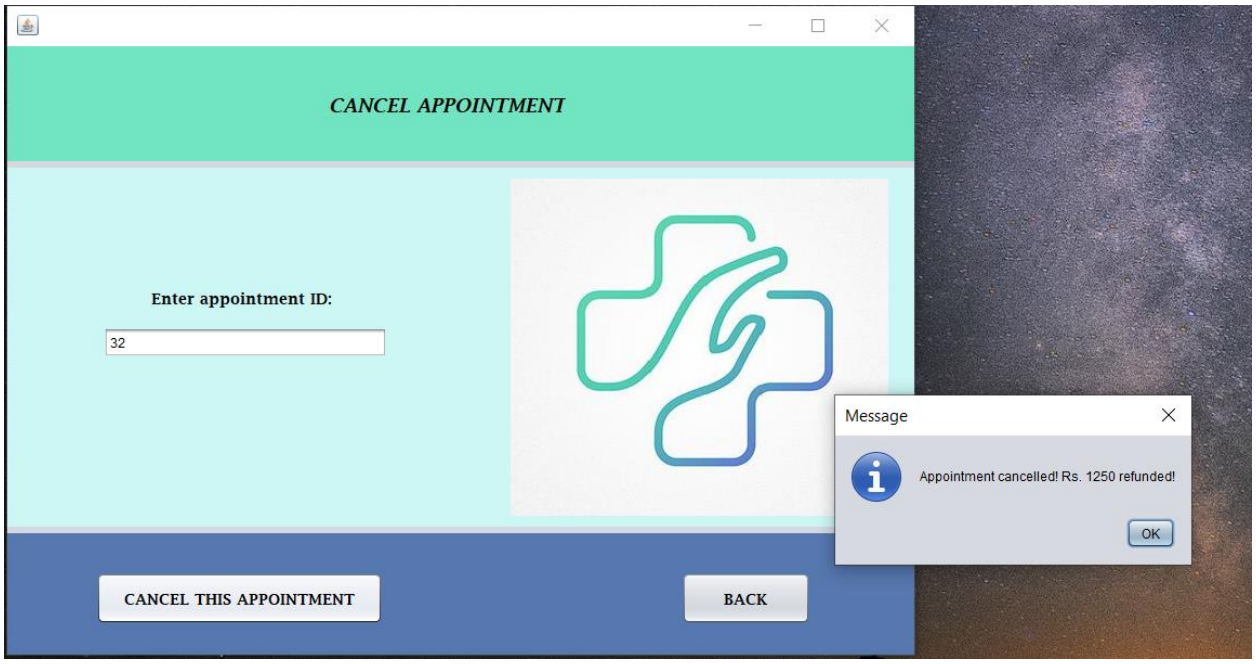


Fig 4.47: Refund after cancellation

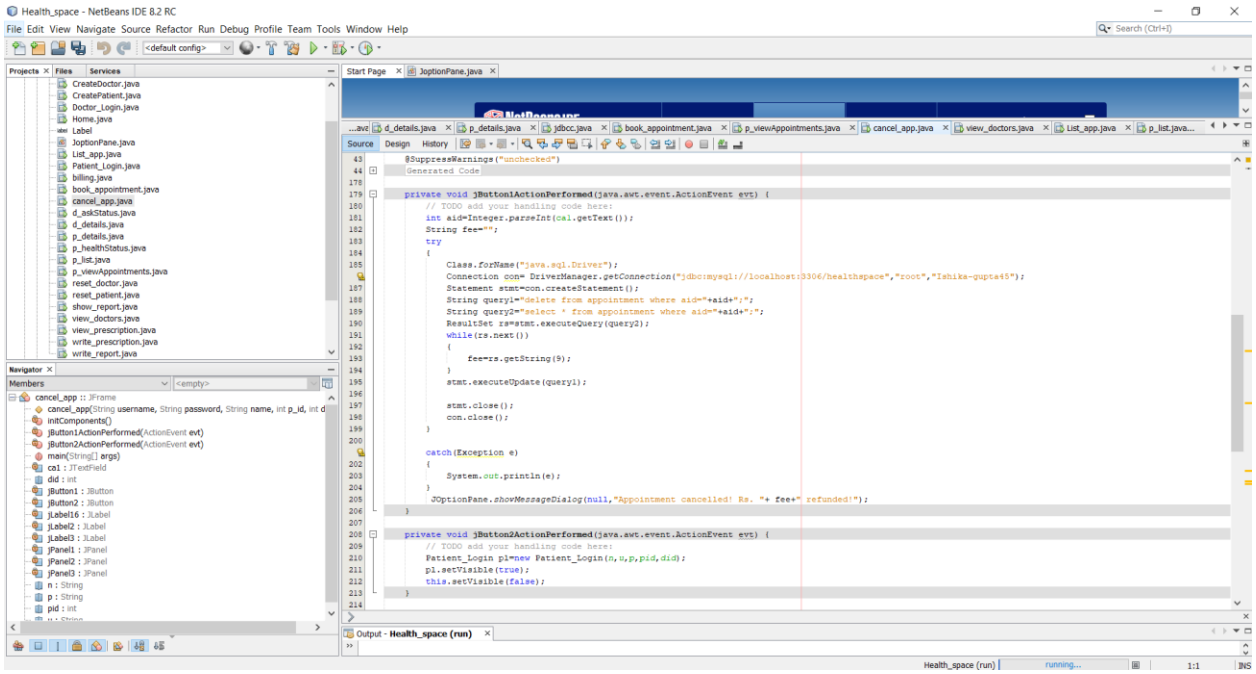


Fig 4.48: Cancelling appointment code snippet

Once the appointment is done, the doctor can use the 'Write Report' and 'Write Prescription' features to write down the results of all the tests that were conducted, the suggestions the doctor has for the patient and the outcomes of the appointment. The doctor can access that particular appointment using the appointment ID which the doctor can view from the 'List of Appointments' feature. Once the doctor writes the report and prescription, the text is stored in the Result table. This report is then projected in the 'View Report' and 'View Prescription' features of the patient.

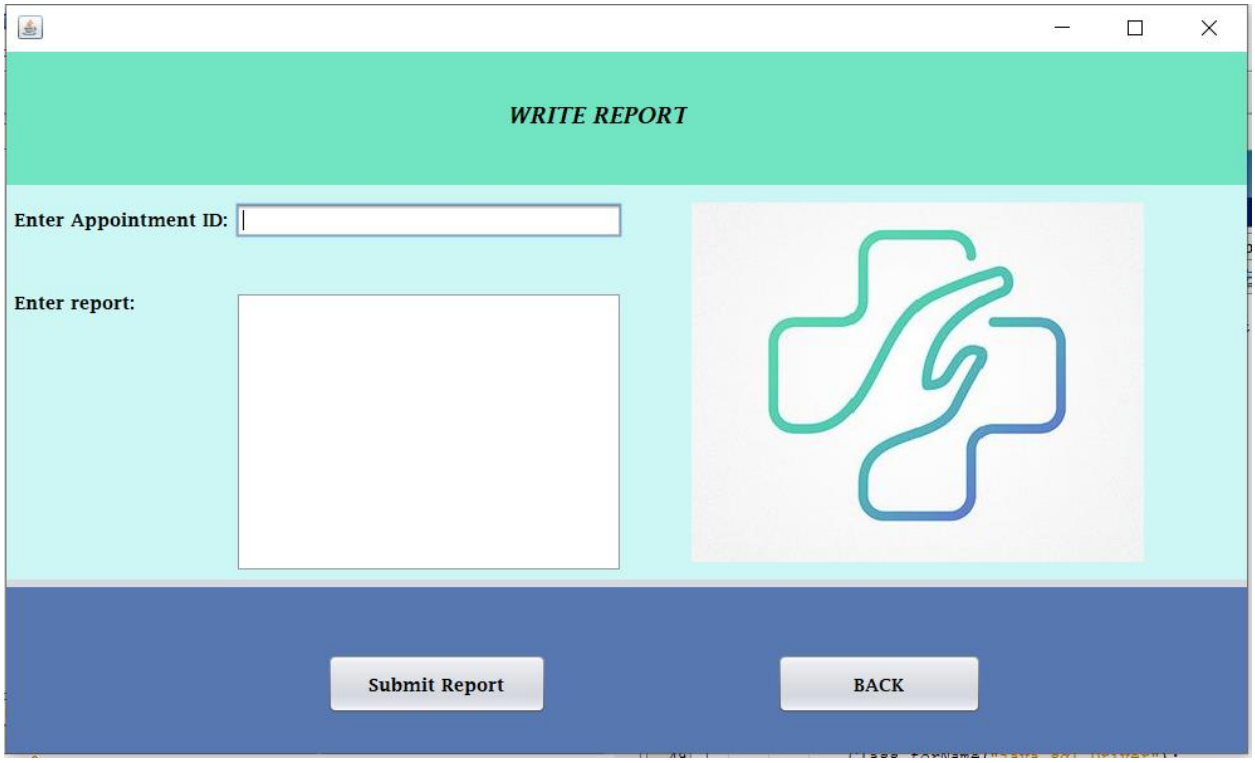


Fig 4.49: Writing report

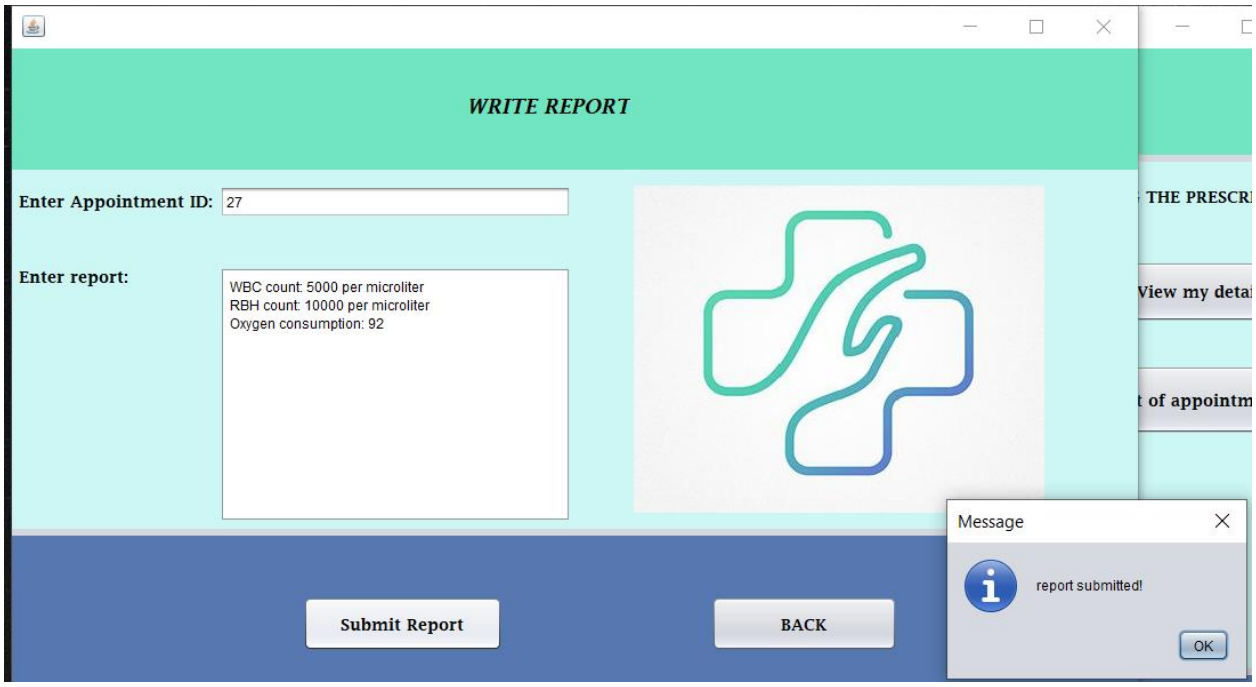


Fig 4.50: Submitting report

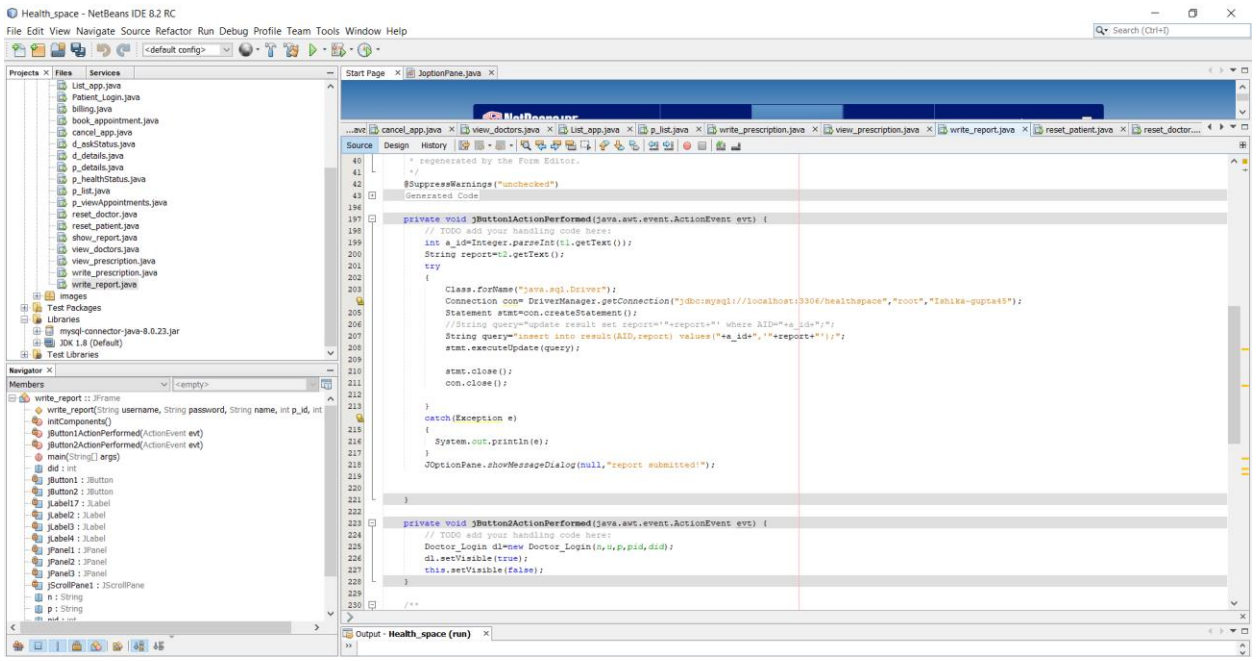


Fig 4.51: Writing report code snippet

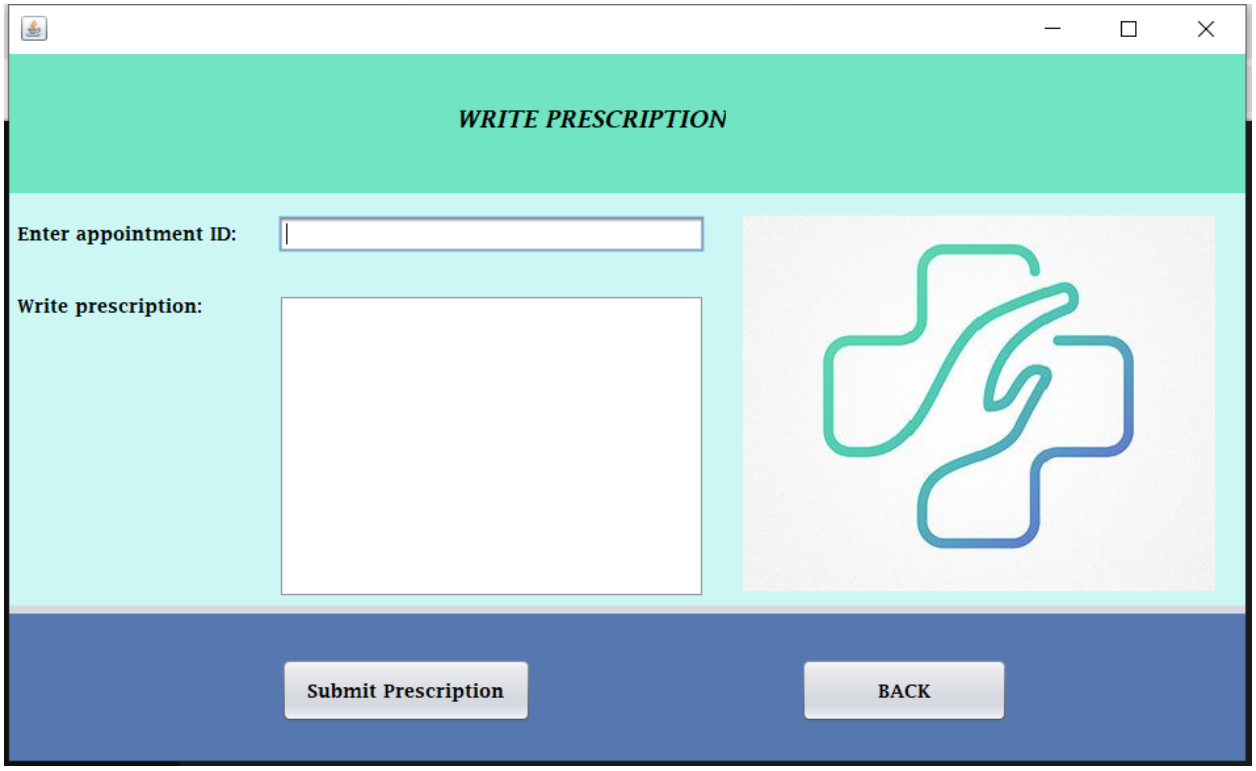


Fig 4.52: Writing prescription

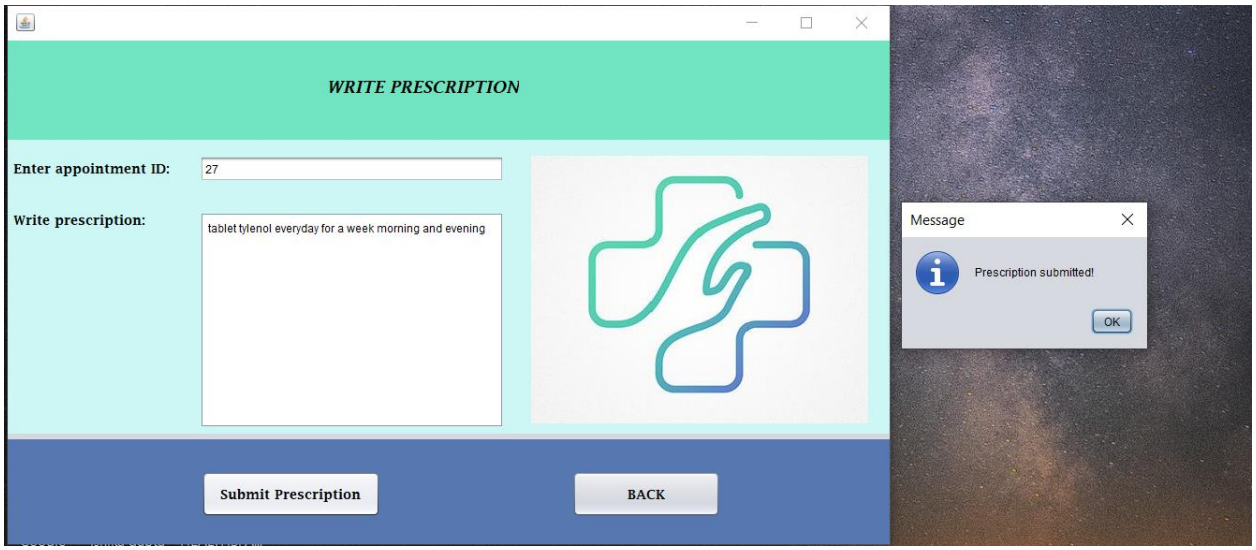


Fig 4.53: Submitting prescription

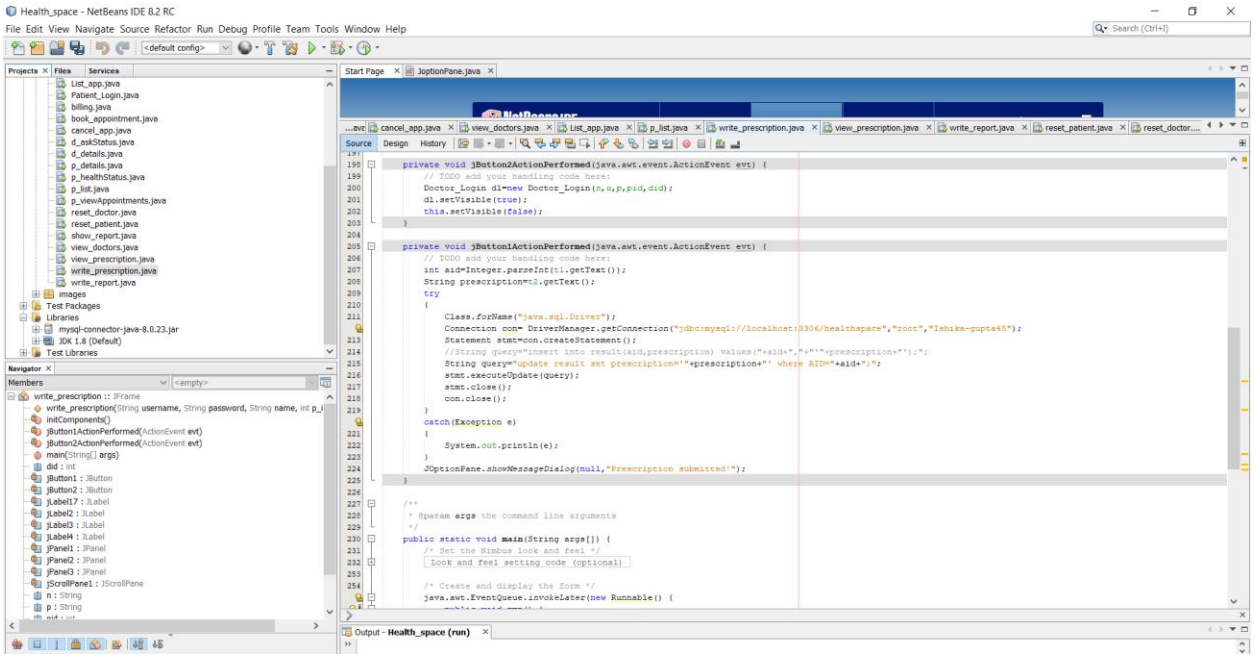


Fig 4.54: Writing prescription code snippet

The 'View Report' and 'View Prescription' features in the patient login porta enable the user to view the report and prescription written by the doctor using the 'Write Report' and 'Write Prescription' features after the appointment. This frame asks the user for the appointment ID of the appointment they wish to see the report of. Once appropriate value is added, the report is displayed from the Result table.

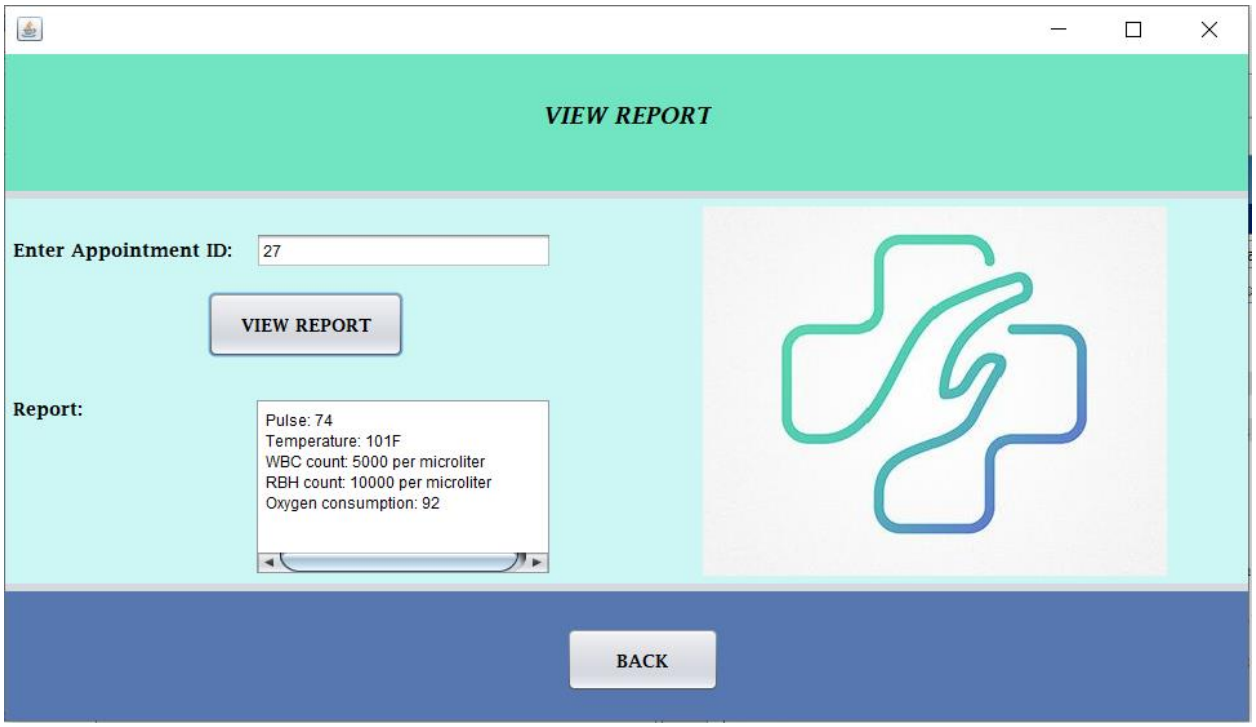


Fig 4.55: Viewing report

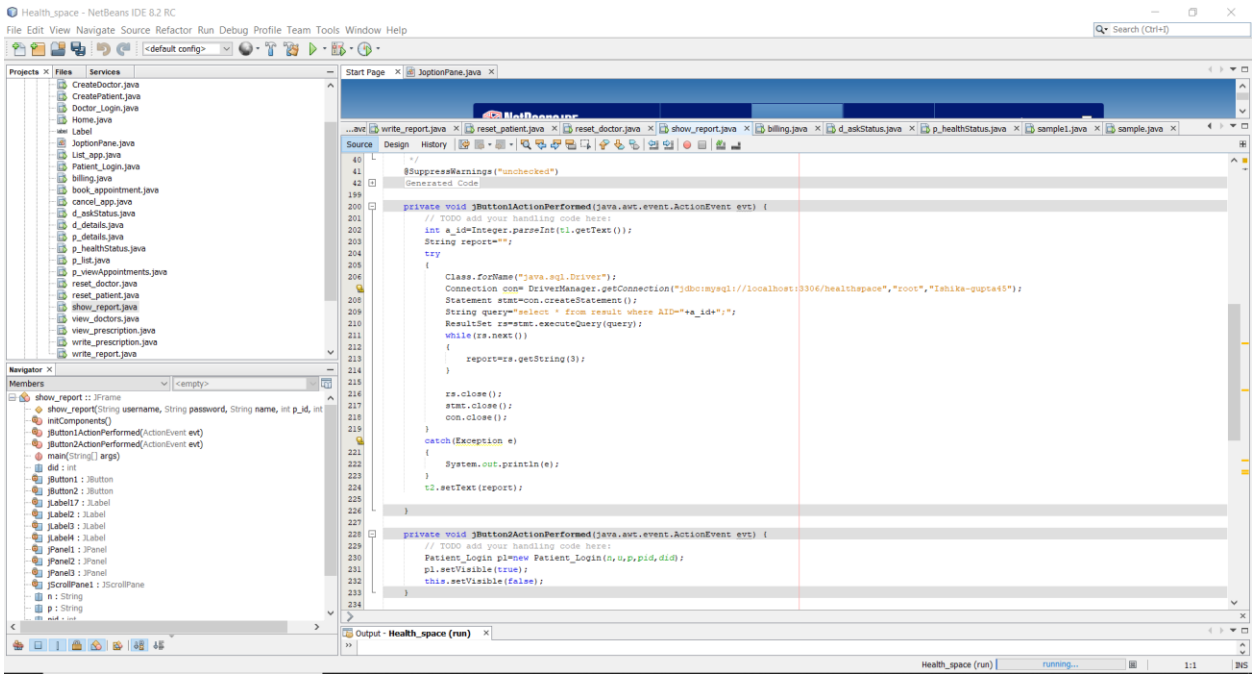


Fig 4.56: Viewing report code snippet

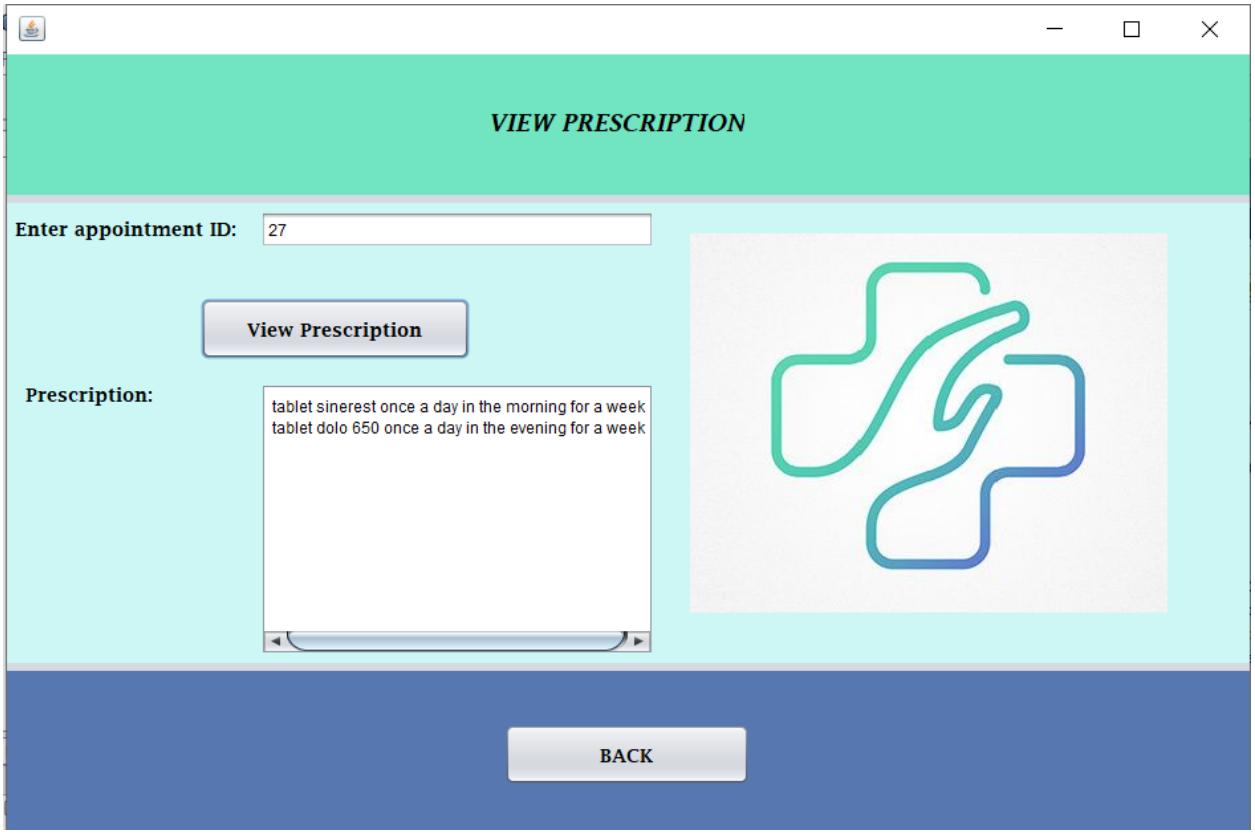


Fig 4.57: Viewing prescription

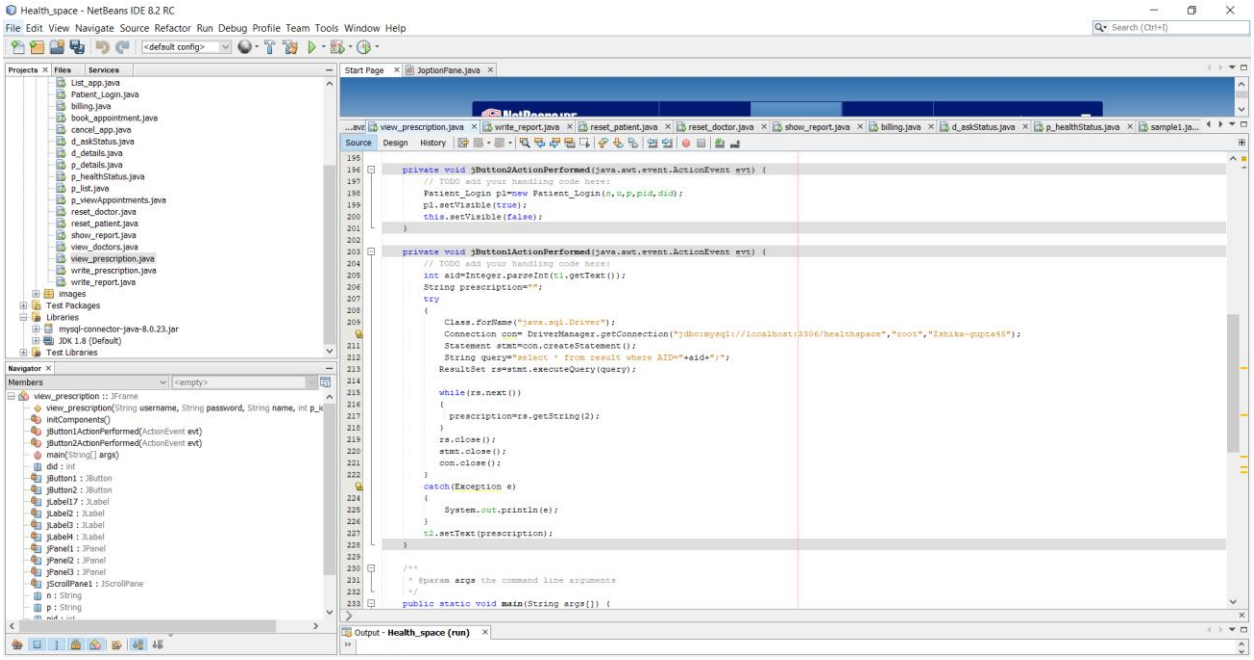


Fig 4.58: Viewing prescription code snippet

CONCLUSION AND FUTURE SCOPE

5.1 CONCLUSION:-

From the above stated facts and information, the importance of health is well-understood and that the usage of the Healthspace enables improved patient care. 'Healthspace' makes managing information very convenient, for the patient as well as the doctor. It is an application that will stick by its user right from the registration process and keeps constant track of any updates. With different logins for both patient and doctor, one can easily access information relevant only to them. Its value also notices a surge with the ongoing pandemic that urges to take a closer look at their health.

5.2 LIMITATIONS:-

The main restriction is that the given application is just available on desktops and not mobiles. The features are limited only to the basic appointment requirements. Also, the input given in the current database isn't enough for complete and effective use of the application. The chat box feature is rudimentary and doesn't enable us to retain the previous conversations between the doctor and patient.

5.3 FUTURE SCOPE:-

- We hope to move on from not just being a desktop application but to also being a mobile application for increasing its accessibility.
- We hope to provide necessary information about different resources available in different hospitals.
- We hope to improve our fundamental chat-box feature to improve the relationship between doctors and patients.
- We hope to shift our paradigm to a wider range of hospitals than just a single one.

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